THE IRON TRADE REVIEW

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Heavy Buying of Lake Superior Iron Ores

Follows First Sales at Ten Cents Below Schedule of 1911—
Large Tonnages of Pig Iron Sold in the Pittsburgh District

The selling of iron ore for 1913 delivery has started in at a lively rate and fully 5,000,000 tons have been booked. It is believed that within a very few days a large percentage of the ore offered for sale will be taken by consumers. It had been expected that 1911 prices would prevail, but on account of the reduction in freight rates of Minnesota ore-carrying railroads since 1911, of 20 cents per ton, the Cleveland firm which made the first sale of the season, Tuesday, decided to shade the 1911 prices by 10 cents, making the schedule, old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer $3.40. This schedule is an advance of 65 cents on the Bessemer ores compared with 1912, and an advance of 60 and 55 cents, respectively, on the quotations on old range and Mesabi non-Bessemer. Although the ore mining companies have been benefited by a reduction in freight rates by Minnesota roads and ore unloading charges, since 1911, their taxes have been heavily increased, supplies cost more, it is not improbable that there will be some wage advances and the lake carrying charge will be higher. In view of these conditions, and with the general prosperity prevailing, the new schedule is considered very reasonable.

Pig Iron

In pig iron, the principal activity has been in the Pittsburgh district, in which the buying of steel-making irons has continued. The Jones & Laughlin Steel Co. purchased 42,000 tons of basic, nearly all of it at $17.25, following the purchase of 15,000 tons of basic. There is very little basic available in the Pittsburgh district and higher prices are expected. A central Pennsylvania steel-maker was, however, able to shade $18.25, delivered, on the purchase of 3,500 tons of basic. For the past four or five weeks, 250,000 tons of steel-making iron has been purchased in the Pittsburgh district. A Delaware river iron pipe-maker has closed for 5,000 tons of forge.

Railroad Buying

Rail-makers now have on their books about 2,000,000 tons of rails for next year's delivery, while negotiations are pending for an additional million tons. It is believed that the mills will end the year with fully 3,000,000 tons on their books and record-breaking production in 1913 is expected. The recent order of the Baltimore & Ohio railroad amounted to about 60,000 tons. Car orders placed during the past week have been heavy and amounted to about 15,000, including 400 for the Duluth, South Shore & Atlantic, awarded to the American Car & Foundry Co.; 900 for the Chicago, Terre Haute & Southwestern, taken by the Haskell & Barker Car Co.; 1,000 for the Erie, awarded to the Western Steel Car & Foundry Co., and 500 awarded to the Standard Steel Car Co. The Norfolk & Western is inquiring for 19,000 tons of shapes, 21,000 tons of plates and 3,600 tons of bars, for delivery from March to October, 1913, at its Roanoke, Va., shops, which are to be enlarged. The Corporation mills alone have taken orders for plain material for 12,000 additional cars, requiring about 100,000 tons of steel. The Pennsylvania railroad will build an additional lot of cars in its own shops, and a leading industrial company will soon appear in the market for 4,000 cars.

Finished and Crude

While several independent companies have advanced quotations on some finished products, particularly plates, the Steel Corporation announces that it will continue to quote unchanged 1.45c, Pittsburgh, on plates and shapes, and 1.40c on steel bars, and will accept orders at such prices for delivery throughout next year. Corporation officials are very strong in the belief that it is important to prevent prices from going up too fast and they will exert their influence to prevent further advances. In the Chicago district, orders are being taken with considerable freedom for delivery in the second half of next year. A Buffalo maker reports the sale of 20,000 tons of open-hearth rolling and forging billets for shipment into the central west during the next four months. Prices realized range from $28 on the rolling billets to $35 for the forging steel. There is a scarcity of crude steel in leading centers.

Exports

Activity in the export market continues to be an important factor of the present conditions. American mills are obtaining some very desirable business. The Steel Corporation has taken 18,000 tons of a rail order for trans-continental railways of Australia, which totaled 80,000 tons. English makers and Australian plants will take the remaining tonnage. The Corporation has also taken 5,000 tons for the Buenos Ayres Central railroad. In bridge work, it has booked 7,000 tons for British Columbia and 2,000 tons for Argentine Republic. Argentine railways have given a contract to an American builder for 2,500 cars.

PITTSBURGH

Heavy Buying of Steel Making Pig Iron

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Nov. 19.

Mills continue to book heavy tonnages for next year's delivery. Consumers appear willing to take whatever shipment manufacturers are able to offer, and considerable tonnage has been sold for third and fourth quarter shipment.

Prices of steel plates and structural shapes have advanced, although the leading interest continues to adhere to the 1.45c quotation on both products. A number of mills are asking as high as 1.60c for forward delivery. It is just about impossible to obtain steel bars or structural shapes for anything like prompt delivery.

Buying of steel-making iron continues at a tremendously heavy rate. About 70,000 tons were involved in this week's sales. Higher prices have been reflected by purchases made the last two days.

The market for spot furnace coke is much softer than it was five or six days ago. Fuel has sold as low as $3.80. Considerable contracting has been done, at a spread from $3 to $3.25. Several small sales have been made at $3.50.

The iron and steel scrap market continues comparatively weak. Heavy melting steel is selling in the neighborhood of $15, and some buyers claim $14.75 can be done.

Pig Iron.—The market for steel-making iron continues decidedly active. It is estimated that 70,000 tons were involved in transactions closed the last six or seven days. The Jones & Laughlin Steel Co., this city, yesterday bought about 42,000 tons of Bessemer at $17 and $17.25, valley, although the latter figure was paid for at least 30,000 tons. Iron was obtained from several valley blast furnace interests and will be shipped the first quarter. The $17.25, valley, price now represents the market. About a week ago, the Jones & Laughlin Steel Co. closed for 10,000 tons of basic, through a broker in this city.

One of the Cleveland pig iron merchants has sold 5,000 tons of basic to a broker in this city at $16.60, valley, for shipment the first half, which is the highest price paid for basic this year. The Pittsburgh Steel Co. has not yet closed negotiations for 20,000 tons of basic for this year's shipment. An Allegheny valley interest, several days ago, bought 1,000 tons at $16.25.

Sellers of malleable iron today received an inquiry for about 100 tons of low sulphur iron a month for shipment to Brownwich, Eng. Foundry is being firmly held at $17.50, valley, and malleable is quoted at the same figure. Dealers are asking $16.50, valley, for gray forge iron.

During the past four or five weeks, about 250,000 tons of steel-making iron have been obtained in this district, including about 165,000 tons of Bessemer and 85,000 tons of basic. The Republic Iron & Steel Co., Youngstown, O., the Cambria Steel Co., Johnstown, Pa., the Jones & Laughlin Steel Co., this city, and the Youngstown Sheet & Tube Co., Youngstown, have figured prominently in recent purchases. We quote all grades as follows:

(Remainder of Year and First Quarter.)

Bessemer, valley	$17.25
Bessemer, Pittsburgh	18.15
Basic, valley	16.25 to 16.50
Basic, Pittsburgh	17.15 to 17.40
No. 2 foundry, valley	17.50
No. 2 foundry, Pittsburgh	18.40
Malleable, valley	17.50
Malleable, Pittsburgh	18.40
Gray forge, valley	16.00
Gray forge, Pittsburgh	16.90

Ferro-Alloys.—The heaviest consumer in this district has not yet closed negotiations for 8,000 tons of 50 per cent ferro-silicon, 8,000 tons of ferro-chromium, and 1,500 tons of aluminum, although it is probable that orders will be placed before the end of this week. No other large transactions are pending.

We quote 80 per cent ferro-manganese at $70 to $75, Baltimore, for prompt delivery and $61 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, for prompt and forward delivery; 12 to 13 per cent, $25 to $26, 11 to 12 per cent, $24 to $25; 10 to 11 per cent, $23 to $24; 9 to 10 per cent, $22 to $23, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2,000 pounds.

Plates.—Some of the independent mills have withdrawn the 1.50c quotation and are now quoting at a range from 1.55c to 1.60c for forward shipment. The leading interest continues to quote 1.45c on plates for specific work and some of the independent mills are still selling at 1.50c. Plates for prompt shipment are selling at a spread from 1.65c to 1.90c, although it would be impossible to obtain heavy tonnages for anything like prompt delivery.

No large orders for cars have been placed in this district, although a number of important inquiries are pending. Some estimate that inquiries aggregate in the neighborhood of 40,000 miscellaneous cars. Plates for both forward and prompt shipment are quoted as follows:

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.45c to 1.60c for shipment after Jan. 1 and 1.65c to 1.90c for prompt shipment. For extras, see card of Sept. 1, 1909.

Sheets. — Heaviest consumers already have covered requirements through the first half of the year, and some interests have obtained tonnage for delivery the last six months of 1913. Rumors to the effect that the leading interest had advanced prices a few days ago proved untrue. An independent mill, in a position to make rather prompt delivery, advised today that no difficulty is experienced in obtaining $2.35 for No. 28 gage black sheets and $3.60 for No. 28 gage galvanized sheets—$2 and $4, respectively, above prevailing quotations. Blue annealed products have sold at $1.75 and even as high as $2 for No. 10 gage. Such sales have involved small tonnages and these prices are looked upon as premiums rather than regular market quotations. Further complaint about the scarcity of raw materials is heard. Quotations for forward delivery follow:

Flat Sheets.

Black Sheets.—Nos. 10-12 gage, $1.90 per 100 pounds; Nos. 13-14 gage, $1.95; Nos. 15-16 gage, $2.00; Nos. 17-21 gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-26 gage, $2.15; No. 27 gage, $2.20; No. 28 gage, $2.25; No. 29 gage, $2.30; No. 30 gage, $2.40.

Tin mill sizes. Nos. 15-16 gage, $2.00 per 100 pounds; Nos. 17-21 gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-27 gage, $2.15;

No. 28 gage, $2.20; Nos. 29-30 gage, $2.25; Nos. 30½-31 gage, $2.30; No. 32 gage, $2.35.

Blue Annealed.—Nos. 3-8, $1.60 per 100 pounds; Nos. 9-10, $1.65; Nos. 11-12, $1.70; Nos. 13-14, $1.75; Nos. 15-16, $1.85.

Galvanized.

Nos. 10-11 gage, $2.40 per 100 pounds; Nos. 12-14 gage, $2.50; Nos. 15-16 gage, $2.65; Nos. 17-21 gage, $2.80; Nos. 22-24 gage, $2.95; Nos. 25-26 gage, $3.10; No. 27 gage, $3.25; No. 28 gage, $3.40; No. 29 gage, $3.55; No. 30 gage, $3.70.

Roofing Sheets

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation. 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate.—It is estimated that all previous records for the production of tin and terne plate will be broken this year. In 1911, 1,756,070,000 pounds or 783,960 gross tons were produced. It is roughly estimated that production, this year, will exceed 1,900,000,000 pounds. Tin plate this year has sold at a range from $3.35 to $3.60 and some material has brought $3.70. Heaviest consumers have covered requirements through 1913. The prevailing price follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburgh district.

Rails and Track Material.—Although leading eastern railroads have placed contracts for next year's tonnages, it is probable that all of these tonnages will be supplemented. Several railroads already have placed second orders with mills in this district. There seems to be even less demand for Bessemer rails than was the case a year ago. Next year's contracts already have been specified against and mills will be actively engaged through the first half of the year.

Demand for light rails continues heavy and shipments are deferred two or three months. Talk of an advance on light rails continues to be heard. Standard spikes are being held at $1.90, and track bolts are quoted at a range from 2.40c to 2.50c. Rails are quoted as follows, with a base price on open-hearth standard sections at 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.40c to 2.50c, base, Pittsburgh.

Railroad Spikes.

4½, 5 and 5½ and 9-16	$1.90
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets and Sheet Bars.—The market for semi-finished steel products continues rather inactive, due to the acute scarcity of steel. A sale of Bessemer billets was made a short time ago by a mill outside of this district at above $27, Pittsburgh, and open-hearth rolling billets have sold as high as $28, Pittsburgh, during the past week or 10 days. Bessemer sheet and tin bars continue to be quoted at $28 to $28.50, Pittsburgh. Forging billets are quoted at $34. To a certain extent, these quotations are nominal as there are not enough sales to indicate a normal market.

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $27.00, with the usual extra for size and analysis, and open-hearth rolling billets, $27.50. Bessemer sheet and tin bars are quoted at $27.50 to $28.00 and open-hearth sheet bars are quoted $28.00 to $28.50, f. o. b. Pittsburgh and Youngstown, with full freight to destination added. Forging billets are quoted at $34.00, Pittsburgh.

Hoops and Bands.—Specifying has been heavy and some new demand for hoops and bands is reported this week. Hoops are quoted at a range from 1.50c to 1.60c, Pittsburgh, and bands at a spread from 1.40c to 1.45c. Quotations are as follows:

Hoops in carload lots, 1.50c to 1.60c, Pittsburgh, in less than carload lots, 1.55c to 1.60c; bands, 1.40c to 1.45c, base, with net extras, as per standard steel.

Merchant Bars.—A Cleveland consumer scoured this market last week for a rather heavy tonnage of steel bars for prompt shipment. After a day's search, he advised that no bars could be obtained at less than the prevailing warehouse price. Consumers, as a general rule, are fairly well covered for requirements during the first half although some of the important interests have not yet fully covered needs. Iron bars are quoted at a range from 1.70c to 1.80c, and from present indications the minimum price will soon disappear. There has been good demand for iron bars, and specifying has been to the full extent. Shafting is firm on a basis of 60 per cent off for carload lots, and 55 per cent off for less than carloads. This product is being held more firmly at present than at any time this year. An advance of about two points is expected before Jan. 1. The regular bi-monthly wage settlement, between the Amalgamated Association and the Union mills in the central west, Nov. 12, showed a realized price on base sizes of iron bars during September and October of 1.335c against 1.2518c, shown by the preceding settlement. The puddling rate goes up from $6 to $6.15 a ton, 15c above the rate otbained by the Sons of Vulcan. Prevailing quotations are:

Common iron bars, 1.70c to 1.80c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c to 1.45c; plow and cultivator, 1.40c to 1.45c; channels, angles, zees, tees, under 3 inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds of a size, 0.35. Cold rolled and ground shafting, 60 per cent off in carloads and 55 per cent in less than carloads delivered in base territory.

Muck Bar.—The muck bar market continues quiet. No sales have been announced for about two months and it is possible only to give nominal quotations.

We quote the market at $32 to $32.50, Pittsburgh. Muck bar makers advise that the scarcity of puddlers has affected production to a considerable extent.

Bolts, Nuts and Rivets.—Makers are now asking 2.10c for structural and 2.20c for boiler rivets for forward delivery. Bolt and nut discounts remain unchanged. Manufacturers are from two to three months deferred on shipments. Revised quotations follow:

Rivets

Button head structural rivets, 2.10c; cone head boiler rivets, 2.20c.

Bolt and Nut Discounts

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 75, 10 and 2½; cut threads, 75 and 7½; larger and longer, 70 and 5.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled, 75, 10, 10 and 2½; cut, 75, 10 and 7½; larger and longer, 70, 10.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.80 off list; hot pressed hexagon blank or tapped, $6.40.

Cold pressed C. & T. square, blank or tapped, $5.80 off; hexagon, blank or tapped, ⅝-inch and larger, $6.70 off; smaller than ⅝-inch, $7.30 off.

Structural Shapes.—Several makers of structural shapes have advanced prices $1 and $2 a ton and these products are now quoted at a spread from 1.45c to 1.60c for forward shipment. The minimum quotation represents that of the Carnegie Steel Co., which is selling only for specific work. Some independent mills continue to quote 1.50c, while others announce that their quotations range from 1.55c to 1.60c.

The Riter-Conley Mfg. Co. has taken a contract for 2,000 tons for a new 10-story 780 x 150-foot building, for the Solvay Process Co., Syracuse, N. Y. The McClintic-Marshall Construction Co. has taken 700 tons for a new mill building and galvanizing plant for the Weirton Steel Co., Weirton, W. Va., the organization of which was mentioned in THE IRON TRADE REVIEW, several weeks,

ago. This company has also taken small contracts for a foundry extension to the Pittsburgh Valve & Fittings Co., Barberton, O., and a new building for the Superior Steel Co., Carnegie, Pa. Quotations for prompt and forward shipment are:

Standard structural shapes, 1.45c to 1.60c, for shipment after Jan. 1 and 1.60c for prompt shipment. For extras see card of Sept. 1, 1909.

Merchant Pipe.—The pipe market has been rather quiet this week. Nearly all contracts have been specified against, and mills are endeavoring to meet obligations this year. Shipments are being urged, as buyers are anxious to complete pipe projects before the cold weather makes outdoor work impossible.

It is not probable that either steel or iron pipe will be advanced until contracts for next year's tonnages are taken. Official discounts to jobbers, subject to the usual preferential discount to the large buyer, are as follows:

Iron and Steel Pipe Basing Prices.

STEEL.

	Butt.		Lap.	
	Black.	Galv.	Black.	Galv.
⅛, ¼ and ⅜ inch.	72	52	..	..
½ inch	76	66	..	..
¾ to 3 inch	79	71	..	..
2 inch	..	..	76	68
2½ to 6 inch	..	..	78	70
7 inch to 12 inch	..	..	76	66
13 to 15 inch	..	..	53	..
Extra Strong, Plain Ends.				
⅛, ¼ and ⅜ inch.	68	58	..	..
½ inch	73	67	..	..
¾ to 1½ inch	77	71	..	..
2 to 3 inch	78	72	..	..
2 inch	..	..	74	66
2½ to 4 inch	..	..	76	68
4½ to 6 inch	..	..	75	67
7 to 8 inch	..	..	68	58
9 to 12 inch	..	..	63	53
Double Extra Strong Plain Ends.				
½ inch	63	57	..	..
¾ to 1½ inch	66	60	..	..
2 to 2½ inch	68	62	..	..
2 inch	..	..	64	58
2½ to 4 inch	..	..	66	60
4½ to 6 inch	..	..	65	59
7 to 8 inch	..	..	58	48

IRON.

⅜ inch	66	47	..	..
½ inch	70	57	..	..
¾ to 2½ inch	73	62	..	..
2 inch	..	..	69	59
2½ to 6 inch	..	..	71	62
7 to 12 inch	..	..	69	56
Extra Strong Plain Ends, Card Weight.				
⅜ inch	64	53	..	..
½ inch	68	61	..	..
¾ to 1½ inch	72	63	..	..
2 and 2½ inch	73	64	..	..
2 inch	..	..	67	59
2½ to 4 inch	..	..	71	62
4½ to 6 inch	..	..	70	61
7 to 8 inch	..	..	64	54
9 to 12 inch	..	..	59	48
Double Extra Strong Plain Ends, Card Weight.				
½ inch	58	50	..	..
¾ to 1½ inch	61	53	..	..
2 and 2½ inch	63	55	..	..
2 inch	..	..	56	50
2½ to 4 inch	..	..	61	55
4½ to 6 inch	..	..	60	54
7 and 8 inch	..	..	53	43

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—The market for iron and steel tubes remains unchanged. Makers are being urged for material and some new demand is reported. Quotations on iron and steel tubes follow:

	Steel.	Iron.
1½ inch	..	..
1¾ to 2¼ inch	62	47
2½ inch	64½	52
2¾ to 3¼ inch	69½	54½
3½ to 4½ inch	72	57
5 and 6 inch	64½	..
7 to 13 inch	62	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire.—An independent wire manufacturer today announced that he had been taking contracts for delivery the first six months at the prevailing minimum quotations. Several interests are now quoting both wire and nails at $1.55 and $1.75, respectively. The leading interest and a number of independent mills have not advanced prices. Cut nails are quoted at $1.70. The prevailing quotations are:

Wire nails, jobbers' carload lots, $1.70 to $1.75, retailers' carload lots, $1.75 to $1.80; cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.70 to $1.75; retailers' carload lots, $1.75 to $1.80, with 40c for galvanizing; plain wire to jobbers in carloads, $1.50 to $1.55; and to dealers, in carloads, $1.55 to $1.60; polished staples, $1.70 to $1.75; galvanized staples, $2.10.

Wire Rods.—Several sales of wire rods have been made at $30, Pittsburgh, and we now quote the market at that figure. Heaviest consumers covered requirements earlier in the year. One interest has advanced the price of rods, straightened and cut to length, $2 a ton, changing ⅜-inch rods from 1.45c to 1.55c. The leading interest states that the report that it is out of the market is not true.

Coke.—The market for spot furnace coke has gone above the $4 mark this week, but is now quoted somewhat below the minimum quotation of a week ago. During the past 10 days, sales at $4.10 and even as high as $4.25, ovens, have been made, but producers have been unable to obtain more than $4 the last few days. A consumer outside of this district has closed for a round tonnage at $3.80, ovens, for prompt delivery. Corrigan, McKinney & Co., Cleveland, have bought 60,000 tons of standard furnace fuel to be delivered over the entire year at $3, ovens, and several other sales have been made at that figure. A Chicago interest this week closed for about 7,000 tons a month at $3.25, ovens. Several sales have been made at $3.50, ovens, but this figure is regarded as an extreme price. Most of the coke that was sold at that figure was especially low in phosphorus.

Spot foundry coke is being held at $4.50 and sales at $4.75 have been made. Foundry coke in the contract market is selling at a spread from $3.75 to $4.25. It seems impossible for ovens in the upper and lower Connellsville regions to produce more than 400,000 tons a week. The Connellsville *Courier* for the week ending Nov. 9, says that production was 399,142 tons, an increase of 1,889 tons over the week before. Merchant ovens made the larger gain. Shipments made a net increase of 140 cars. Revised quotations are:

Connellsville furnace	$3.80 to 4.00
Connellsville furnace contract	3.00 to 3.25
Connellsville foundry	4.50
Connellsville foundry contract	3.75 to 4.25

Old Material.—The market for heavy melting steel has dropped to $15—$1.25 below the prevailing quotation of a fortnight ago. Some buyers advise that they believe it possible to obtain this stock at $14.75 and one of the dealers, a few days ago, bought 400 tons at that figure. Low phosphorus scrap has declined 25 cents and we quote the market at $18 to $18.50.

Machine shop turnings have declined 25 cents, and cast borings have reflected slight weakness,—now being quoted at a range from $10.25 to $10.50. Agricultural malleable is selling at a spread from $13 to $13.50. Cast borings and No. 1 cast scrap have shown less weakness than any other stocks but these products, too, have suffered from the recent slump. Revised quotations follow:

Heavy melting scrap	$15.00
Rerolling rails	16.50 to 17.00
Malleable	14.50 to 15.00
Agricultural malleable	13.00 to 13.50
Bundled sheet scrap	13.00 to 13.50
Iron axles	25.00 to 26.00
Old iron rails	16.75 to 17.25
Stove plate	11.00 to 11.50
No. 1 wrought scrap	15.50 to 16.00
Old car wheels	15.75 to 16.25
Low phosphorus	18.00 to 18.50
Machine shop turnings	11.00 to 11.50
No. 1 busheling	14.25 to 14.75
Country mixed	11.00 to 11.25
Cast borings	10.25 to 10.50
No. 1 cast scrap	14.50 to 15.00

The Allegheny Steel Co., Pittsburgh, advises that reports to the effect that it had recently closed negotiations for an additional plant are untrue. The company is considering no extension at the present time.

The Trumbell Iron & Steel Co., Warren, O., will have its sheet and tin plate plant in operation next May. The plant consists of 12 mills, six sheet and six tin plate.

CHICAGO

Booking Finished Materials for Second Half

Office of THE IRON TRADE REVIEW,
1328 Monadnock Blk., Nov. 19.

The past week has been characterized by increasing specifications and vain attempts on the part of consumers to place new business for early delivery. Current quotations in this territory are effective only for forward shipment, which in the majority of cases extends well into the second half. Very little relief can be obtained from eastern producers, as their situation is analogous to the previous condition of western mills, their unfilled tonnages preventing the acceptance of business for first half delivery. Railroad buying of rails, structural material and cars is maintaining its activity, and some producers believe that it is largely responsible for the present flood of business. In spite of the discouraging attitude that producers have taken for some time against second half business, they are being forced to accept considerable tonnage for delivery at that time.

Pig Iron.—Inquiry for both northern and southern iron is considerably improved and a noticeable demand for spot shipment is developing. Foundry business is constantly increasing and a repetition of previous conditions wherein buyers found that their demands were insufficient, is expected. Local producers are well sold up and it is estimated that a pronounced buying movement would exhaust their capacities. Northern iron is very firm on a basis of $18, local furnaces, and sales for fair tonnages have been made at this price. The bulk of the business, however, still consists of small tonnages for filling in and of special analysis, as many foundries have stocks of low grade iron, which must be toned up with high grades. Inquiries which have appeared during the week include two for 1,000 tons each from northern Illinois melters and one of like tonnage from a Michigan foundry. A northern Illinois melter has taken 300 tons of No. 2 southern iron at $14.50, Birmingham, for delivery during the first half, and two other sales, 200 tons each, have been made on the same basis. The minimum for first half delivery on southern iron remains at $14.50, Birmingham, but business for first quarter delivery can be placed at $14. Sales made for shipment during the remainder of the year are at prices ranging from $14, Birmingham, to $15.25, the market, however, being well represented by the former quotation.

The following prices represent the market for Chicago delivery, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces:

	Prompt shipment.	First half.
Lake Superior charcoal	$18.75	$18.75
Northern foundry No. 2	18.00	18.00
Southern foundry No. 2	18.35	18.85
South'n Silveries, 5 per cent sil.	.....	19.85
Jackson co. silv'r's 8 per cent.	21.40	21.90
Malleable Bessemer	18.00	18.00
Alabama basic	.....	18.85

Merchant Bars. — The market for bar iron is very much stronger, the minimum quotation now being 1.55c. While it is very probable that 1.52½c could be done on very desirable tonnages, such business would be insufficient to affect the market materially. Specifications on steel bars are being maintained at a very high rate and now can be taken only for far advance shipment. Agricultural implement makers are heavy buyers of both iron and steel bars and mills continue to run further behind in deliveries on the former.

We quote f. o. b. Chicago, as follows:

Bar iron, 1.55c to 1.60c, hard steel bars, rerolled, 1.60c to 1.75c, soft steel bars, bands and small shapes, 1.63c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 60 per cent off list for carload lots, 55 per cent off for less than carloads.

On iron and steel from local stock we quote as follows:

Bar iron, 1.95c per pound base; soft steel bars, 1.95c per pound base; soft steel hoops, 2.20c, full extras.

Structural Material.—Quotations on this material in the west remain nominal, as they are effective only for delivery during the second half of 1913. The mills now have sufficient contract tonnage on their books to tax their capacities through the third quarter, and the eastern mills are unable to relieve the situation, as their prospective unfilled tonnage prevents their taking new business for first half delivery. Store prices are exceedingly strong and further advances are expected.

Structural contracts placed during the week amount to 6,429 tons, of which the leading interest has taken 355 tons from the Pacific Gas & Electric Co. for towers on the San Rafael Line, Cal., and 640 tons from the Chicago, Milwaukee & St. Paul Railway Co. for truss spans. The same fabricator has also taken 1,500 tons for the Fort Dearborn hotel, Chicago. The Kansas City Structural Steel Co. has taken 733 tons from Sears, Roebuck & Co., for a new building at Kansas City, Mo.; Noelke-Richards have taken 1,500 tons for an addition to the Webster building, Chicago, and the Minneapolis Steel & Machinery Co. has taken 364 tons for the residence of Chas. Gates at Minneapolis. The Inland Steel Co. has let a contract to the Wisconsin Bridge Co. for 123 tons of structural material for supporting and housing belt conveyors at Indiana Harbor. The Bucyrus Co. has placed a contract for 305 tons for a plate shop at South Milwaukee with the Worden-Allen Co., and the Milwaukee Bridge Co. has taken 382 tons from the Chicago, Milwaukee & St. Paul Railway Co., for through plate girders. A contract covering 527 tons of shapes for the construction of the Sacramento hotel, Sacramento, Cal., also has been placed.

We quote f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles over 6 inches, $2.15 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $2.05 per 100 pounds, base; channels, 3 inches and larger, $2.05 per 100 pounds, base.

Rails and Track Fastenings. — The movement of rails continues to be exceptionally heavy and specifications for track fastenings grow larger week by week. Prices of spikes and track bolts are firmer and the continuation of the present flood of specifications may bring about further advances. Western railroads continue to be active rail buyers, and while the larger part of the business has been taken by the leading interest, eastern makers have participated in a fair degree.

We quote light rails f. o. b. Chicago, as follows:

Light rails, carloads, 25 to 45-pound, 1.30c; 16 to 20-pound, 1.35c; 12-pound, 1.40c; 8-pound, 1.50c.

Light section relayers, 45 pounds and un-

der, subject to inspection, $24 to $24; standard section relaying rails, subject to inspec-

Track fastenings f. o. b. Joliet are as follows:

Track fastenings, f. o. b. Joliet, angle bars 1.50c; railroad spikes, 1.95c; smaller size spikes, 1.75c base; track bolts with square nuts, 2.30c to 2.40c.

Plates. — Car buying is being watched with great interest in this territory as almost the only hope of a betterment in delivery is in a reduction of car orders. No abatement in activity has taken place, however, and car builders will operate at capacity for over the year at least. The Duluth, South Shore & Atlantic has ordered 400 ore cars from the American Car & Foundry Co., and the Chicago, Terre Haute & Southeastern has ordered 900 coal cars from the Haskell & Barker Car Co. The Erie has ordered 1,000 box cars from the Western Steel Car & Foundry Co., and 500 box cars from the Standard Steel Car Co.

We quote f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅝ to 100 inches wide, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $2.05.

Bolts, Nuts and Rivets.—Specifications are maintained at the same rate and the prices are very firm. The continuation of present activities will probably cause additional advances in the near future. We quote prices on bolts, nuts and rivets as follows:

Rivets

Structural rivets, ¾ to 1¼ inches, 2.08c to 2.18c, base, Chicago, in carload lots; boiler rivets, 0.10c additional.

Bolt and Nut Discounts

Carriage bolts up to ⅝ x 6 inches, rolled thread, 75-10-2½; larger sizes, 70-5.

Machine bolts, up to ⅝ x 4 inches, rolled thread, 75-10-7½; cut thread 75-10-2½; larger sizes, 70-10.

Hot pressed nuts, square head, $5.80 off per cwt.; hexagon, $6.40 off per cwt.

Sheets. — Notwithstanding increasingly strong quotations on galvanized sheets, the demand is even heavier and great difficulty is being experienced in placing new business. New purchases are being confined to third quarter delivery, and are discouraged by producers in this territory.

We quote f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.15c; No. 12, 2.20c. Box annealed, No. 28, 2.70c. Galvanized No. 28, 3.95c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products. — The week has brought about no cessation in the demand for this material and the majority of the orders is still being taken by the leading interest. Prices are exceedingly strong and a further advance on all lines may be expected before the first of the year.

We quote f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.88; retailers' carload lots, $1.93, retailers' less than carload lots, $1.98; painted barb wire, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $1.98, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.68; retailers' carload lots,. $1.73.

Merchant Pipe and Tubes. — The market is very firm at the ruling quotations and while there is less activity, makers in this territory are not catching up with the demand to any material extent.

We quote store prices on merchant pipe and tubes as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	41.2
⅜ inch	73.2	62.2	67.2	51.2
½ inch to 1½ inch.	76.2	67.2	70.2	58.2
Lap.				
2 inch	73.2	64.2	67.2	57.2
4½ inch to 6 inch.	75.2	66.2	68.2	59.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	66.2	55.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	59.2	47.2
½ inch	69.2	57.2	64.2	52.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	65.2	53.2
7 inch to 8 inch....	64.2	52.2	59.2	47.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1½ inch	60.2	48.2	....	....
Lap.				
2 inch	58.2	46.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes.

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	37	..	55½
1¼ to 2¼ inch.....	53	38	34
2¾ to 3¼ inch.....	63	48	44
3½ to 4½ inch.....	65½	48	44
5 to 6 inch.....	53	..	..

Cast Iron Pipe. — In spite of the strength of the market, there is no apparent haste on the part of consumers to cover for their requirements. Specifications for small lots continue in satisfactory quantities and some fair tonnages are in the market. La Crosse, Wis., will require 300 tons of water pipe on which bids were closed Monday.

We quote f. o. b. Chicago, as follows:

Four-inch water pipe, $30, 6 to 12 inches, $28, larger sizes, $27; gas pipe, $1 a ton higher.

Old Material.—Scrap is still weak in this territory and dealers are having considerable difficulty in maintaining prices. Although there has been comparatively little movement during the week, one of the large buyers has taken more than its consumption for a like period. Dealers are reluctant to quote lower prices, as their inability to obtain them results in further shading. Railway lists remain small on account of the continued scarcity of both cars and labor. Although a car shortage is decried in some quarters on account of the willingness on the part of the railroads to move dealers' scrap, this action can be ascribed to the fact that such movement produces a revenue, which is not the case when railroad scrap is involved. Lists issued during the week were small. The Minneapolis, St. Paul & Sault Ste. Marie has invited bids on 40 tons of malleable iron, and the Chicago, Milwaukee & St. Paul has issued a list including 1,221 tons of mixed scrap.

We quote for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$14.75 to 15.25
Old iron rails	17.00 to 17.50
Rerolling rails (5 ft. and over)	16.25 to 16.75
Old steel rails (3 ft. and und.)	14.50 to 15.00
Frogs, switches and guards	13.75 to 14.25
Heavy melting steel	13.50 to 14.00
Shoveling steel	13.50 to 14.00

Net Tons

No. 1 R. R. wrought	$13.00 to 13.50
No. 2 R. R. wrought	12.00 to 12.50
Arch bars and transoms	17.00 to 17.50
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.50 to 17.00
Iron car axles	21.50 to 22.00
Steel car axles	17.75 to 18.25
Locomotive tires	13.50 to 14.40
Dealers forge	11.00 to 11.50
Pipe and flues	10.00 to 10.50
No. 1 cast	13.50 to 14.00
No. 1 busheling	11.25 to 11.75
No. 2 busheling	8.50 to 9.00
No. 1 boiler cut	10.00 to 10.50
Boiler punchings	13.00 to 13.50
Cast and mixed boring	7.25 to 7.75
Machine shop turnings	8.25 to 8.75
Railroad malleable	13.50 to 14.00
Agricultural malleable	12.25 to 12.75
Angle bars, splices, etc., iron	16.50 to 17.00
Angle bars steel	12.50 to 13.00
Stove plate and light cast scrap	11.00 to 11.50

Contract for Open Hearth

The Andrews Steel Co., Newport, Ky., has placed a contract with the S. R. Smythe & Co., Pittsburgh, for a new 60-ton open-hearth furnace. The Smythe company also will provide equipment.

The Alabama City furnace of the Southern Iron & Steel Co., Birmingham, Ala., has been blown in, after having been out 23½ days for repairs. The furnace is now in very good condition and the size of the runs is increasing. Work in the company's mines at Crudup, Ala., was started Oct. 31, with a full force of men.

CINCINNATI

Pig Iron Quotations Advanced

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., Nov. 19.

Pig Iron.—Prices on both southern and southern Ohio furnace iron have been advanced 50 cents a ton during the past week, due to a certain extent to the fact that the last quarter of the year is almost over, and practically all of the sales being made at present extend into the first half of 1913. This has in turn led to an almost general establishment of first quarter prices as the minimum quotation, while the maximum refer to the second quarter, beyond which the furnaces refuse to quote. A little more activity is noticeable in the market, but sales are far below those of a month and a half ago, and a betterment of conditions is not expected before the first of the year. General inquiries continue light and for small tonnages, and, with the exception of a few quiet sales to a large pipe company, a good sized lot of iron has not been sold in this territory since September.

Southern Ohio iron is now given at $17, Ironton, for No. 2 foundry, for first half shipment, but it is probable that some could be had for the rest of this year only at $16.50, furnace. There is also some re-sale iron in the market, half of which is being offered at $16.50, Ironton, and the other half at $17, for delivery to extend from the present time into or through the first half. Malleable and basic are both scarce, and the shortage of coke is causing much trouble with certain furnaces in this district.

The Tennessee furnaces that have been offering southern No. 2 foundry iron at $13.50, Birmingham basis, for the last quarter, are now quoting $14 for December and first quarter shipment, which places them on the same basis with one and possibly two large Alabama stacks. Prices can therefore be given in the south without reference to the two states separately at from $14 to $14.50 for December and the first quarter, and from $14 to $15 for the second quarter, Birmingham.

The Virginia Iron, Coal & Coke Co. has notified the market that it has withdrawn all prices on its No. 2X iron for delivery prior to next July. Ferromanganese has been selling in good lots recently at $61, Baltimore, but the price is now $65, Baltimore, for the first quarter.

A recent sale of 800 tons of southern Nos. 2 and 3 iron was made to a local concern last week for this year and first quarter delivery at $14 and $13.50, Birmingham, respectively. There are inquiries in the market for 1,000 tons of foundry iron from a Michigan stove manufacturer for the second quarter; 700 tons of foundry iron from a Michigan threshing machine company for the first half; 200 tons of northern iron from Newark, O., and 500 tons of foundry iron for the first half from central Indiana. With freight rates $3.25 from Birmingham, and $1.20 from Ironton, we quote Cincinnati prices as follows:

Southern foundry No. 1	$17.75 to 18.25
Southern foundry No. 2	17.25 to 17.75
Southern foundry No. 3	16.75 to 17.25
Southern foundry No. 4	16.50 to 17.00
Southern gray forge	16.50 to 16.75
Mottled	16.25 to 16.75
Southern No. 1 soft	17.75 to 18.25
Southern No. 2 soft	17.25 to 17.75
Standard southern car wheel	31.00 to 31.50
Northern No. 2	17.95 to 18.20
Northern No. 3	17.45 to 17.95
Northern No. 4	17.20 to 17.70
Silveries 8 per cent silicon	20.20 to 21.20

Coke. — The coke market is unchanged from that of last week, being uncertain and strong especially in reference to spot sales. A good block of spot furnace coke was recently sold in this territory at $4.25 a ton, ovens, and another sale of furnace grades brought $4.50, ovens. Contract prices are much lower, and furnaces, as a general rule, state that they cannot pay over $3 a ton in comparison with the prices on contracts for pig iron on their books. Some contracts, however, have recently been closed for future deliveries at $3.25, ovens. The foundry market is strong, but not many large sales of foundry coke are being made. There is practically no coke in the Pocahontas fields, and the supply is also short in the Wise county district. We quote below from the leading coke producing districts as follows:

	Prompt shipment.	Contract.
Connellsville district:		
Foundry coke	$4.50 to 4.75	$3.75 to 4.00
Furnace coke	3.85 to 4.25	3.00 to 3.50
Wise county district:		
Foundry coke	$4.00 to 4.25	$3.75 to 4.00
Furnace coke	3.50 to 4.00	3.25 to 3.75
Pocahontas district:		
Foundry coke	$3.75 to 4.00	$3.25 to 3.75
Furnace coke	3.25 to 3.75	2.75 to 3.00
New River:		
Foundry coke	$3.75 to 4.25	$3.25 to 3.75
Furnace coke	3.25 to 3.75	2.75 to 3.00

Finished Material.—The local mill has again advanced its prices on sheets, and is now holding for 2.35c on black No. 28, and 3.50c on galvanized No. 28 gage, both Pittsburgh basis, delivery to begin within from six to eight weeks from the date of sale. Specifications are coming in faster than they can be filled, and the local situation is very strong. Jobbers are apparently short of supplies, and this is causing, to a certain extent, the heavy demand for shipments.

Demand for practically all warehouse materials is greater than the stocks in the dealers' yards can supply, and the latter are finding it a difficult matter to replenish any of the materials carried by them. One of the larger warehouses has advanced practically all of its prices 10 cents per 100 pounds, and the others may follow shortly. We quote below warehouse prices f. o. b. Cincinnati, as follows:

Steel bars, 2c to 2.10c base; iron bars, 1.95c to 2.05c base; structurals, 2.10c to 2.20c base; plates, ¼ inch and over, 2.10c to 2.20c base; sheets, blue annealed, No. 10, 2.25c to 2.35c base; rivets, cone head, 2.60c to 2.70c base; cold rolled shafting, 58 per cent discount; steel hoops, 2.10c to 2.20c base; full extras; boiler tubes as follows: 1½ inch, 46 per cent discount; 1¾ to 2¼ inch, 57 per cent discount; 2½ inch, 60 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 68 per cent discount; 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2.15c to 2.25c; ⅝ inch square and larger, 2.25c to 2.35c; ½ inch square and larger, 2.35c to 2.45c; 5-16 to ⅜ inch square and larger, 2.55c to 2.65c; and ¼ inch square and larger, 2.65c to 2.75c.

Old Material. — The scrap iron market continues weak, and prices are gradually being reduced, having dropped in some cases from 25 to 50 cents a ton within the past few days. Mills are buying only enough to supply their requirements for short intervals, and dealers are slow to add to their stocks because of the difficulty of disposing of them, and the liability of prices to go lower. We quote prices dealers will pay and also dealers' selling prices in Cincinnati and vicinity as follows:

Gross Tons

Old iron rails	$14.00 to 14.50
Old steel rerolling	12.25 to 12.75
Old iron axles	18.50 to 19.00
Heavy melting scrap	12.25 to 12.75
Relaying rails	21.50 to 22.00
Bundled sheet scrap	9.25 to 9.75

Net Tons

Old No. 1 R. R. wrought	$11.50 to 12.00
No. 1 machinery cast	11.75 to 12.25
No. 1 busheling	9.75 to 10.25
Stove plate	8.50 to 9.00
Machine shop turnings	7.75 to 8.25
Cast borings	8.50 to 9.00
Heavy turnings	8.25 to 8.75
Mixed cast	10.75 to 11.25
Malleable	8.00 to 8.50

PHILADELPHIA

Eastern Finished Market Continues Active

Office of THE IRON TRADE REVIEW,
Philadelphia, Nov. 19.

Active trade conditions in the eastern Pennsylvania iron and steel market are strongly maintained. Not the slightest symptoms of tapering off in the movement of finished iron and steel materials are apparent. Eastern mills are still receiving as heavy an inflow of new business as they have been entering for a number of weeks; in some cases even heavier, and specifications against contracts are very liberal. A large inquiry that has appeared for the Norfolk & Western railroad calls for 21,000 tons of plates, 19,000 tons of shapes and 3,600 tons of bars for steel car construction. Pig iron is moving fairly well, though the recent rapid price advance seems generally to have been checked. Low phosphorus iron, however, is up another 50 cents. Old material shows the one easier spot in the market. Sentiment here is more bearish and values have dropped in some grades, while in others the steady advance has continued.

Pig Iron.—No heavy buying by consumers generally is now manifested by the market, but there is a fair run of new orders and inquiries of a miscellaneous character. Prices are strong and, while the recent rapid advance seems to have been checked, the current quotations are very firmly established. Producers with ample order books are conservative in their attitude and appear, in no wise, inclined to push the market. Forge iron, both for puddling and pipe making use, is still in good demand in eastern Pennsylvania districts. A Delaware river pipe maker closed for 5,000 tons of forge and No. 3 for January and February at prices of $17.75 and $18, delivered, respectively, which represent new high levels for pipe iron along the Delaware river. Another pipe maker continues to make offers for a lot of 5,000 tons of No. 3 or more. The officials of the United States Cast Iron Pipe & Foundry Co. at a meeting just held in this city, decided not to buy additional iron at present, as this consumer has heavy tonnages, principally southern iron, now under contract. A Virginia pipe shop is out for 6,000 tons equally divided between No. 3 and forge for first quarter. Eastern iron makers are still in the market for several thousand tons of standard forge which is strong at $17.50 to $17.75, delivered eastern Pennsylvania. Miscellaneous foundry iron inquiries are fairly numerous. The B. & O. railroad is inquiring for 1,825 tons of Nos. 1 and 2 for first half delivery at Baltimore, Newark, O., and Chillicothe, C., of which 1,100 tons are for Baltimore. Other inquiries include 1,500 tons of No. 2 plain, 1,000 tons of No. 2, 500 tons of No. 2 and others for buyers in eastern Pennsylvania, usually for first half. A Trenton consumer has not yet closed on a lot of 3,000 tons. Eastern Pennsylvania No. 2 continues quoted at $18.25 to $18.50, Philadelphia, the former for early shipment. Basic is quiet. A central Pennsylvania steel maker took 3,500 tons of this grade from an eastern maker and was able to shade $18.25, delivered. The seller in this case was obliged to meet the competition of makers in the Pittsburgh district, who offered iron under $18.25. Some recent buyers of standard low phosphorus for first half at $23.50, Philadelphia basis, have extended these purchases through second half, taking about 5,000 tons of this grade additional at the same price. Other scattered sales of about 1,000 tons are reported including a lot of 500 tons done under rather special conditions at $24.50, Philadelphia. Sellers are now quoting standard low phosphorus at $24, Philadelphia minimum. One large eastern steel company which has been short on low phosphorus has been a recent buyer. Middle western makers of low phosphorus have made some sales in the Philadelphia district.

We quote for delivery this year to consumers' plants in Philadelphia and vicinity, unless otherwise specified, as follows:

Eastern Pa. No. 1X foundry	$18.50 to 18.75
Eastern Pa. No. 2X foundry	18.25 to 18.50
Eastern Pa. No. 2 plain	18.00 to 18.25
Standard forge (Eastern Pa.)	17.50 to 17.75
Basic (Eastern and Central Pa.)	18.00 to 18.25
Virginia No. 2X	18.65 to 18.80
Southern No. 2	18.00 to 18.50
Malleable	19.50 to 19.75
Low phosphorus, Philadelphia	24.00

(First Quarter.)

Malleable	$19.50 to 19.75
Basic	18.00 to 18.25
Eastern Pa. No. 2X foundry	18.25 to 18.50
Eastern Pa. No. 2X plain	18.00 to 18.25
Standard forge (Eastern Pa.)	17.50 to 17.75
Virginia No. 2X	18.65 to 18.80
Low phosphorus, Phila	24.00

Iron and Steel Bars.—Eastern consumers of steel bars not under contract are having much difficulty to get positions on mill schedules for first quarter. One of them recently out for a round tonnage for first quarter has again inquired for about 1,000 to 3,500 tons for that period, but several of the leading mills have been obliged to decline the business, as they are filled up solidly. The large Norfolk & Western inquiry for car material calls for 3,600 tons of bars. Long-extended deliveries on steel bars show no improvement. Rerolling mills continue to get 1.85c, Philadelphia, for prompt bars. The active demand for bar iron, muck bar and other iron mill products remains with eastern Pennsylvania makers. Sales of muck bar have been made for western shipment as far as Chicago. Eastern makers quote common iron bars from 1.60c to 1.70c, mill. The Glasgow Iron Works, Pottstown, Pa., is operating 25 of its 30 puddling furnaces.

We quote for delivery to consumer's plants in Philadelphia and vicinity: Steel bars at 1.55c to 1.60c on contract and common bar iron at 1.67½c to 1.77½c. Prompt steel bars on mill shipments are quoted at 1.75c to 1.85c and from store are quoted at 2c to 2.15c. Cut nails are quoted from $1.85 to $1.90, Philadelphia.

Plates and Shapes.—The Norfolk & Western railroad has put out an inquiry for 19,000 tons of shapes, 21,000 tons of plates and 3,600 tons of bars for delivery from March to October, 1913, to its Roanoke, Va., shops. The material is intended for steel car construction for which the company is planning enlarged facilities. Eastern plate makers are booking new business freely at their schedules of 1.60c, Pittsburgh, for sheared, and 1.65c for universals, or 1.75c to 1.80c, Philadelphia. Their delivery periods run from six to eight weeks. One eastern company without a steel works is offering plates rolled from purchased slabs at 1.70c, Pittsburgh, or 1.85c, Philadelphia, for 10 days' delivery, but its tonnage is limited. Eastern consumers have offered Pittsburgh and middle western plate makers liberal tonnages for first half, but these have been declined, for these mills have little free ton-

nage for first half, and this remains the condition generally of the larger producers, who are quoting 1.50c, Pittsburgh. Eastern shape mills are quoting 1.60c, Pittsburgh, or 1.75c, Philadelphia, for delivery in 10 to 12 weeks, but are reluctant to accept this price on first quarter contracts or beyond. On mill stock deliveries, one maker continues to quote 1.75c, mill. Specifications in both shapes and plates with eastern mills are heavy. The Atlantic Coast Line has placed 2,500 tons of bridge work with the Virginia Bridge & Iron Works. The stock house for the Bergner & Engle brewery, this city, 700 tons, has gone to Levering & Gerrigues.

A report that a sale of 10,000 tons of ship plates has been made for Scotland delivery lacks confirmation. One inquiry for 7,000 tons of plates for export, which has been current in the east, has been closed by the business going to continental makers.

We quote delivered to consumer's plants in Philadelphia and vicinity: Sheared steel plates, 1.65c to 1.75c; universal steel plates, 1.65c to 1.80c; structural shapes, 1.65c to 1.80c. Plates and shapes from store are quoted at 2.15c to 2.25c.

Sheets.—New business in sheets with eastern makers continues very active, and deliveries have become more extended, so that they are now six to eight weeks with the principal eastern Pennsylvania producer. This maker continues to book freely at 1.90c, Pittsburgh, or 2.05c, Philadelphia, for No. 10 gage blue annealed.

We quote for delivery to consumer's plants in Philadelphia and vicinity, No. 10 gage blue annealed sheets at from 1.95c to 2.05c.

Semi-Finished Steel.—The shortage in crude steel, which is pronounced, is considerably handicapping consumers, as some of the eastern steel works are falling behind on their regular contracts. As a result of these conditions, several of the leading eastern sellers are no longer bidding for new orders. The Maryland Steel Co. is increasing its output at Sparrows Point by putting in two additional open-hearth furnaces, making four in all, active. The remaining furnace will not be started. A saw manufacturer in this district is inquiring for an indefinite tonnage of billets and an eastern tin plate maker for 1,500 tons of Bessemer or open-hearth tin bars. A sale of 200 tons of Bessemer billets at $30.40, Philadelphia, is noted.

We quote delivered to consumer's plants in Philadelphia and vicinity 4 x 4-inch open-hearth and Bessemer rolling billets at $28.50 to $30.50 and forging billets at from $34.50 to $38.50.

Coke.—Eastern consumers of furnace coke are not finding it so easy to contract at the reported price of $3, Connellsville ovens, for all of next year. There is still considerable uncovered requirement in the east, and several furnaces are shopping around. A sale of 1,000 tons of West Virginia furnace coke for prompt shipment was done at $3.85, ovens. A block of 5,000 tons of prompt Virginia furnace coke was sold for southern Ohio delivery at $4, ovens.

Old Material.—Demand for scrap is quieter and the tone of the market generally easier. Prices in some grades have sagged and in others have gone higher, so that the effect is a spotted condition of values. Sentiment among the dealers is more bearish. Little has been done in heavy steel or in railroad wrought, as consumers have heavy tonnages owing them and the minimum of the former grade is down about 25 cents. Cast scrap, malleable and some of the specialties are in good demand and have shown some advance. A sale of 500 tons of heavy cast at $15.25, delivered, is reported. A producer has sold 3,000 tons of low phosphorus scrap at $20, delivered, a new high price.

We quote gross tons delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$18.50 to 19.00
Old steel rails (rerolling)	17.00 to 17.50
No. 1 heavy melting steel	15.50 to 16.00
Old car wheels	15.00 to 15.50
Old iron axles	24.00 to 25.00
Old steel axles	19.50 to 20.50
No. 1 railroad wrought	17.25 to 17.75
Wrought pipe	14.00 to 14.50
Cast borings	11.50 to 12.00
Machine shop turnings	11.50 to 12.00
Heavy cast (broken)	14.75 to 15.25
Malleable	13.50 to 14.00
Stove plate	11.50 to 12.00
No. 1 forge	14.00 to 14.50
Low phosphorus	19.50 to 20.00

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J., $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

ST. LOUIS

Inquiries Confined to Small Lots

Office of THE IRON TRADE REVIEW, St. Louis, Nov. 19.

Pig Iron.—Inquiries for pig iron in the St. Louis territory are limited to car loads and 50 tons lots, and there are not many of that kind. Consumers seem to be filled up for a while, and are not manifesting any interest beyond their requirements, which are covered through the first quarter. The furnace men are comfortably booked as far ahead as they care to be, and are not making any effort to obtain new business. The most important sale reported last week was 500 tons of Sloss No. 2 soft, for delivery in Belleville, Ill., over the first half of next year. Prices on southern and northern iron are unchanged. Prices on southern iron delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$18.25 to 19.25
Southern No. 2	17.75 to 18.75
Southern No. 3	17.50 to 18.50
Southern No. 4	17.25 to 18.25

Coke.—Transactions in coke have dropped to the minimum. Prices are unchanged as follows:

We quote 72-hour Connellsville foundry grades, $4.50 for immediate shipment or delivery through the year; 48-hour Connellsville furnace, $4.00; best 72-hour Virginia foundry, $3.75 to $4.00; 48-hour Virginia furnace, $3.25 to $3.50. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material.—It is estimated that at least 10,000 tons of scrap iron, including rolling mill grades and foundry cast and steel, were sold in the St. Louis territory last week. The steel mills are in need of material, and as the railroads have no large amount of scrap on hand, dealers are confident that higher prices will prevail soon. The relaying market in particular is very firm, and large tonnages are being sold out of the St. Louis territory. The Vandalia railroad is out with a list of 400 tons of scrap.

Prices which dealers are willing to pay for scrap f. o. b., St. Louis, follow:

Gross Tons

Old car wheels	$15.00 to 15.50
Old iron rails	15.50 to 16.00
Rerolling rails (5 ft. and over)	16.00 to 16.50
Old steel rails (3 ft. and und.)	14.50 to 15.00
Light section relayers (45 lbs. and under, subject to inspec.)	24.00 to 25.00
Relaying rails, subject to insp.	24.50 to 25.00
Frogs, switches and guards cut apart	15.50 to 15.25
Heavy melting steel	14.75 to 15.25
Shoveling steel	12.50 to 13.00

Net Tons

No. 1 railroad wrought	$13.00 to 13.50
No. 2 railroad wrought	12.50 to 13.00
Arch bars and transoms	15.50 to 16.00
Knuckles, couplers and springs	12.50 to 12.75
Shafting	17.50 to 17.50
Iron car axles	20.00 to 21.00
Steel car axles	17.50 to 18.00
Locomotive tires	13.50 to 14.00
Pipes and flues	9.00 to 9.50
Tank iron and cut boilers	9.00 to 9.50
No. 1 cut busheling	11.50 to 11.50
No. 2 cut busheling	9.50 to 10.00
Cast and mixed borings	7.25 to 7.75
Machine shop turnings	8.75 to 9.25
Railroad malleable	12.00 to 12.50
Agricultural malleable	10.50 to 11.00
Stove plates	10.00 to 10.50
Angle splice bars (iron)	13.50 to 14.00
Angle splice bars (steel)	12.50 to 12.75

CLEVELAND

Ore Prices Ten Cents Below 1911 Schedule

Office of THE IRON TRADE REVIEW,
Penton Bldg., Nov. 19.

Iron Ore.—The iron ore market for 1913 was opened today by the sale of from 3,000,000 to 4,000,000 tons of ore at prices 10 cents below those which prevailed in 1911. No change has been made in the guaranteed content. The accompanying table shows prices which have prevailed since 1890. Sentiment slowly crystallized in favor of naming the full 1911 prices and Tuesday morning it seemed all but certain that these prices would prevail. But owing to the reduction in freight rates by the Minnesota ore carrying roads, the carrying charge for a large percentage of the ore is 20 cents less than it was in 1911, and for this reason, some of the ore men felt that it was proper to concede 10 cents below the 1911 prices. There has also been a reduction of 5 cents on the unloading charge at lower lake ports. On the other hand, it is confidently expected that the freight rate by lake will be advanced this year, and an advance in wages of miners is not improbable. Other considerations are much higher taxes, which have been imposed on ore properties since 1911, and the increased cost of mining supplies. It is believed that the new schedule will be quickly accepted by ore consumers and that a very large percentage of the ore for 1913 delivery will be sold within a few days.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40.

Pig Iron.—Of the tonnage purchased by the Jones & Laughlin Steel Co., 30,000 were taken by a Cleveland firm at $17.25, furnace, and this firm is now quoting $17.50. Sales of basic have been made at $16.50, and there is very little of this grade obtainable. It seems probable that higher prices will prevail on basic. Cleveland furnaces have been having a great deal of trouble in making deliveries of foundry iron on account of car shortage, and while it is probable that slightly lower prices would prevail if iron could be delivered, $17.50, delivered, is now the minimum. The demand for foundry iron is not brisk, but the market is very strong. One northern interest still has a few thousand tons of iron which it is selling at $13.50 for prompt delivery. For delivery during the remainder of this year and the first half of next year, we quote as follows, delivered Cleveland, the higher quotations being for prompt delivery:

No. 1 foundry	$18.00 to 18.75
No. 2 foundry	17.50 to 18.00
No. 2 southern	18.35 to 18.85
Bessemer	18.15 to 18.40
Lake Superior charcoal	19.10 to 19.75
Silveries, 8 per cent silicon	20.55 to 21.55
Bessemer ferro, 11 per cent	26.55

Coke.—The car shortage continues to be very annoying and coke companies are having much trouble in satisfying their customers. In spite of some softening in the Pittsburgh market, quotations in the Cleveland district remain unchanged.

Connellsville furnace coke, $3.75 to $4.00 for prompt delivery, and $2.75 to $3.00 on contract; Connellsville foundry coke, $4.50 to $4.65 for prompt, and $4.00 to $4.25 on contract.

Finished Material.—The contract for Halle Bros'. addition, involving 3,000 tons, has been awarded to the Tidewater Construction Co., New York. Bethlehem sections will be used. The Great Lakes Dredge & Dock Co. has taken the contract for the Hocking Valley coal dock and car dumper, at Toledo, which will require from 250 to 300 tons of reinforcing bars and from 50 to 100 tons of I beams. The Cleveland Art Museum, for which the contract will soon be awarded, will require 1,300 tons of structural material. Steel companies are avoiding making contracts under present conditions and about the only business being closed is that for prompt delivery, on which premium prices are being paid. Eastern Pennsylvania plate mills are quoting in some instances from 1.70c to 1.75c, their mills, on plates, and in some cases for immediate shipment higher prices have been obtained. A company near Cleveland which has been in the market for from 5,000 to 7,000 tons of plates has decided to buy from month to month to meet its requirements.

Bids will be asked for within a few days on the remainder of the steel involved in the new city hall at Cleveland. The total tonnage is about 4,200 tons of which about 3,700 tons were awarded to the Republic Structural Iron Works Co., Cleveland, and are already on the ground. Bids will be asked on the remainder and award will probably be made within five weeks.

Rivet manufacturers have issued a new card of extras as follows:

Boiler rivets, standard heads; structural

SELLING PRICE OF IRON ORE AND PRICE OF PIG IRON AT DATE OF BUYING MOVEMENT

Season.	Date buying movement.	—Season Iron Ore Prices— Old range Bessemer.	Mesabi Bessemer.	Old range non-Bessemer.	Mesabi non-Bessemer.	—Iron Prices— Valley Foundry Bessemer.	Iron No. 2
1890	Dec. 15, 1889	$5.50	no sale	$5.25	no sale	$22.15	$18.15
1891	June 1, 1891	4.50	no sale	4.25	no sale	15.15	15.00
1892	Jan. 31, 1892	4.50	no sale	3.65	no sale	15.00	13.65
1893	March 15, 1893	3.85	$3.00	3.20	no sale	12.65	12.15
1894	March 1, 1894	2.75	2.35	2.50	no sale	9.65	9.65
1895	April 1, 1895	2.90	2.15	2.25	$1.90	9.40	9.40
1896	May 1, 1896	4.00	3.50	2.70	2.25	12.40	11.15
1897	May 20, 1897	2.60	2.25	2.15	1.90	8.35	8.40
1898	Mar. 20, 1898	2.75	2.25	1.85	1.75	9.55	9.80
1899	Febr'y 1, 1899	3.00	2.40	2.15	2.00	10.30	9.75
1900	Dec. 15, 1899	5.50	4.50	4.25	4.00	24.15	22.15
1901	April 15, 1901	4.25	3.25	3.00	2.75	16.15	14.40
1902	Febr'y 1, 1902	4.25	3.25	3.25	2.75	15.90	15.90
1903	Mar. 20, 1903	4.50	4.00	3.60	3.20	21.50	21.65
1904	April 15, 1904	3.25	3.00	2.75	2.50	13.35	13.15
1905	Febr'y 1, 1905	3.75	3.50	3.20	3.00	15.50	16.00
1906	Dec'm. 5, 1905	4.25	4.00	3.70	3.50	17.25	17.25
1907	Nov. 10, 1906	5.00	4.75	4.20	4.00	21.50	21.50
1908	June 15, 1908	4.50	4.25	3.70	3.50	16.00	15.00
1909	May 10, 1909	4.50	4.25	3.70	3.50	14.75	14.25
1910	Dec. 24, 1909	5.00	4.75	4.20	4.00	19.00	17.25
1911	April 21, 1911	4.50	4.25	3.70	3.50	15.00	13.75
1912	Mar. 20, 1912	3.75	3.50	3.00	2.85	14.25	13.25
1913	Nov. 19, 1912	4.40	4.15	3.60	3.40	17.25	17.50

rivets, standard heads; ship rivets, straight necks, ¾ to 1¼ inches diameter, inclusive, 2 to 5 inches long, inclusive, base.

Above in kegs or bags, weighing approximately 200 to 300 pounds.

Extras per 100 Pounds.

1.	½ and ⅝ inch diameter	$0.50
2.	⅝ and ¾ inch diameter	.15
3.	Rivets larger than 1¼ inch in diam.	.25
4.	Lengths 1 inch and shorter	.50
5.	Lengths over 1 inch and und. 2 inch	.25
6.	Lengths over 5 inches	.25
7.	Flat head rivets	.25
8.	All standard countersunk head rivets	.25
9.	Swell neck rivets	.25
10.	Special heads other than our regular standards, minimum charge	.25
11.	Cold, or hot made solid die rivets, when specially specified	.25
12.	Annealing cold made rivets, ½ inch diameter and larger	.35
13	Small orders for miscellaneous sizes for less than two tons to parties not under contract	.10
14.	Rivets in 100 pound packages	.10
15.	No shipments made of less than 100 pounds of a size.	
16.	All cone and countersunk head rivets to be charged at boiler rivet price.	
17.	Cost of testing and inspection, if any, to be at customer's expense.	
18.	High carbon, or special alloy rivets, special extra price upon application.	

Old Material.—The rolling mills have entered the market again and sales of fair-sized tonnages of No. 1 busheling were made during the past few days at prevailing quotations. Active inquiry by mills in the Pittsburgh district has resulted in strengthening the market for No. 1 machine cast, as these plants are offering higher prices than those quoted last week. Cast is now held at $13.50 to $14. Few sales are being made of heavy melting steel and the quotation on this grade is now $13.50 to $14. Dealers are shipping on old contracts and hold that the lowered quotations do not represent an actual drop in the value of heavy steel, but are due to the over-stocked conditions of the steel plants. They claim that when this surplus stock is reduced to normal, the mills will re-enter the market and accept heavy melting steel at the figures quoted previous to the drop of the past 10 days. The Chicago, St. Paul, Minneapolis & Omaha railroad list closes Nov. 20. Revised quotations, f. o. b. Cleveland, are as follows:

Gross Tons.

Old iron rails	$17.75 to 18.50
Old steel rails (under 6 ft.)	15.00 to 15.50
Old steel rails (over 6 ft.)	16.25 to 16.75
Relaying rails	25.00 to 26.00
Old steel boiler plate	11.50 to 12.00
Malleable iron (railroad)	14.50 to 15.00
Steel axles	19.50 to 20.00
Axle turnings	12.50 to 13.00
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	13.50 to 14.00
Country mixed steel	11.00 to 11.50
Bundled sheet scrap	11.50 to 12.00

Net Tons.

No. 1 R. R. wrought	$14.50 to 15.00
No. 1 busheling	12.50 to 13.00
No. 1 machine cast	13.50 to 14.00
No. 1 dealers' wrought	11.50 to 12.00
Machine shop turnings	8.25 to 8.50
Pipes and flues	10.00 to 10.50
Wrought drillings	8.50 to 8.75
Cast borings	8.00 to 8.50
Stove plate	10.50 to 11.00
Wrought iron piling plate	16.00 to 16.50
Wrought iron arch bars	17.00 to 17.50

NEW YORK

Liberal Lettings of Structural Contracts

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Nov. 19.

Iron Ore.—Representatives of Lake Superior ore sellers have been in the east during the past week, booking reservations of eastern furnace men for next year's delivery. The expectation was expressed by these sellers that 1911 prices would rule on these contracts and that there would be no change in the base guarantees, but the prices were subject to actual schedules to be formally adopted later. Port Henry ore operators are on the verge of naming their next year's schedules and it is very probable that the 1911 prices will be adopted.

Pig Iron. — Light and uneventful trading has characterized the pig iron market in the metropolitan district during the past week. Sizeable sales and inquiries have been few and the interest of buyers has dealt with small quantities of metal. Total sales of the week in the territory have probably not exceeded 5,000 tons, with the largest single lots about 500 tons. Prices show no weakening at the market's inactivity. Eastern Pennsylvania No. 2X generally continues to sell at $18.25 to $18.50, tidewater. Sales of No. 2X and No. 2 plain at full schedule at $17.50 to $17.75, Lehigh Valley, furnace, respectively are noted. The Virginia Iron, Coal & Coke Co., the leading Virginia producer, today withdrew all its quotations on the No. 2X grade to July 1. This maker has been holding No. 2X at $16.00 for first quarter and $15.50, for second quarter. The other grades are not affected. There has been some activity in the Boston market, where sales of about 2,000 tons of foundry have been made, including some lots of Ohio No. 3 iron at full furnace prices, or $19.75, delivered. This price is higher than the New England level for No. 2X, which ranges generally from $19.40 to $19.70, delivered. Buffalo No. 2X is held from $17.25 to $17.50, furnace. Some large tonnages for export to Canada in foundry and malleable grades continue under negotiation in that territory. The scarcity of malleable in the east continues and some sellers have offered as high as $18.00, valley, for first quarter. Some tonnage of first quarter basic for eastern shipment is under negotiation. In the export market, a new lot of 8,000 tons of southern No. 2 for shipment to Genoa, Italy, from December to April, inclusive, is before sellers. We quote for delivery over the remainder of the year at New York tidewater, as follows:

Northern foundry No. 1	$18.50 to 18.75
Northern No. 2X foundry	18.25 to 18.50
Northern No. 2 plain	18.00 to 18.25
No. 2 Virginia	18.80 to 19.20
No. 2 southern foundry	18.25 to 18.50
Malleable	19.00 to 19.25
Gray forge	17.50 to 17.75

(First Quarter.)

Northern No. 2X foundry	$18.25 to 18.50
Northern 2 plain	18.00 to 18.25
No. 2X Virginia	18.80 to 19.20
No. 2 Southern	18.25 to 18.75

Ferro-Alloys.—A large steel making consumer which has been in the market for 6,000 to 8,000 tons of ferro-silicon, a large tonnage of ferro-chrome and other ferro-alloys, has practically closed upon this business with domestic makers. Other consumers of ferro-chrome are active in the market, one for 600 tons and another for 200 tons. This material is selling at from $185 to $200 a ton at maker's plant. Some English makers who a week ago were inclined to offer some ferro-manganese for first half at $61, have again withdrawn and will quote this price for second half only. Very little, if any, first half material at this price is now available. Prompt ferro-manganese is now firm around $75, seaboard.

We quote standard English 80 per cent ferro-manganese at $75, seaboard, for early shipment and at $61, seaboard, for delivery after Jan. 1 and 50 per cent ferro-silicon on contract at $75, Pittsburgh or Philadelphia, for carloads, $74, for larger lots, and $73, for 600 tons or more.

Plates.—Buying of cars, while not so active, is still good. The Dela-

ware, Lackawanna & Western in the week distributed 2,200 freight cars for delivery to be made next fall. The division gives the American Car & Foundry Co., 500 gondolas, 500 box and 250 hoppers; the Standard Steel Car Co., 250 hoppers and 200 refrigerator cars; Barney & Smith Co., 500 box cars. The New York Central Lines are expected to take action very shortly on their large prospective car order. Swift & Co. are inquiring for 250 steel underframes. Eastern Pennsylvania plate makers are universally quoting 1.60c, Pittsburgh, or 1.76c, New York, for sheared and in some cases $1 higher for universals. One mill is quoting 1.70c, Pittsburgh, or 1.86c, New York, on offerings for delivery in 10 days. An eastern maker sold a lot for immediate delivery to Pittsburgh district at 2 cents per pound at the mill. Large middle western plate makers all seem to be practically out of the market for first half. The Wm. Cramp & Sons Ship & Engine Building Co. is low on bids for six torpedo boats for the government opened this week, which will require from 4,000 to 5,000 tons of plates and shapes.

We quote, delivered at New York tidewater on going business, for last quarter or first quarter, 1.76c to 1.86c New York, on sheared plates. Some makers are asking $1 higher for universal plates. Plates from store are quoted at 2.15c.

Structural Shapes.—A very liberal tonnage is reported by the week's structural lettings in this district, some of which has been accumulating for some time. The work now up for bids is only of fair extent. The American Bridge Co. has taken 3,300 tons of bridge work for the Delaware, Lackawanna & Western railroad for next year; the Riter-Conley Mfg. Co., 2,100 tons for a building for the Solvay Process Co., Detroit; A. E. Norton & Co., 1,800 tons for the McKeon Realty Co. loft on West Twenty-fifth street, and 700 tons for the apartment for the Aeon Construction Co., 562-68 West End avenue; Levering & Gerrigues, 1,150 tons for the American Express Co. garage and office building on Forty-fourth street and 1,150 tons for two buildings for the Boston Fish Market Corporation, Boston; Hay Foundry & Iron Works, 1,200 tons for the Cruikshank warehouse, Horatio and Gansevort streets; Ravitch Brothers, 1,000 tons for the Schiff apartment, 105th street and West End avenue; Terry & Trench, 250 tons for four additional areas for the New York Central railroad; McClintic-Marshall Construction Co., 250 tons for a Philadelphia & Reading bridge at Mahanoy, Pa.; Boston Bridge Works, 125 tons for a Boston & Maine bridge at Holyoke, Mass. V. J. Hedden & Sons Co. have the general contract for the addition to the Rhinelander building, this city, 1,600 tons. It is now announced that the Geo. A. Fuller Co. has the general contract for the Cotton Exchange building, this city, the steel for which is expected to go to the leading interest. An award is about to be made on the Brody, Adler & Koch building, 58-62 New street, 1,300 tons. Plans are coming out for the Widener Memorial Library, Boston, about 2,000 tons. A pier for the Lehigh Valley railroad at Jersey City, 600 tons, has been revised. A large hotel for Newark, N. J., is in prospect.

Eastern shape makers are quoting 1.60c, Pittsburgh, or 1.76c, New York, for deliveries in from 10 to 12 weeks. On mill stock shipments, 1.75c, eastern mill, is being quoted.

We quote for New York delivery as follows: Structural shapes, 1.66c to 1.76c. Structural shapes from store, 2.15c.

Iron and Steel Bars.—An active demand for steel bars continues with local mills in this district and with eastern Pennsylvania makers. Prices are firm at a range of 1.60c to 1.70c, mills, for common bars. Steel bar makers are so heavily sold up that they are out of the market for many months. Some lots of steel bars for prompt shipment from re-rolling mills are quoted from 1.85c to 1.90c, tidewater.

We quote for New York delivery, steel bars at 1.56c and common iron bars at 1.65c to 1.70c. Steel bars from store are quoted at 2 cents.

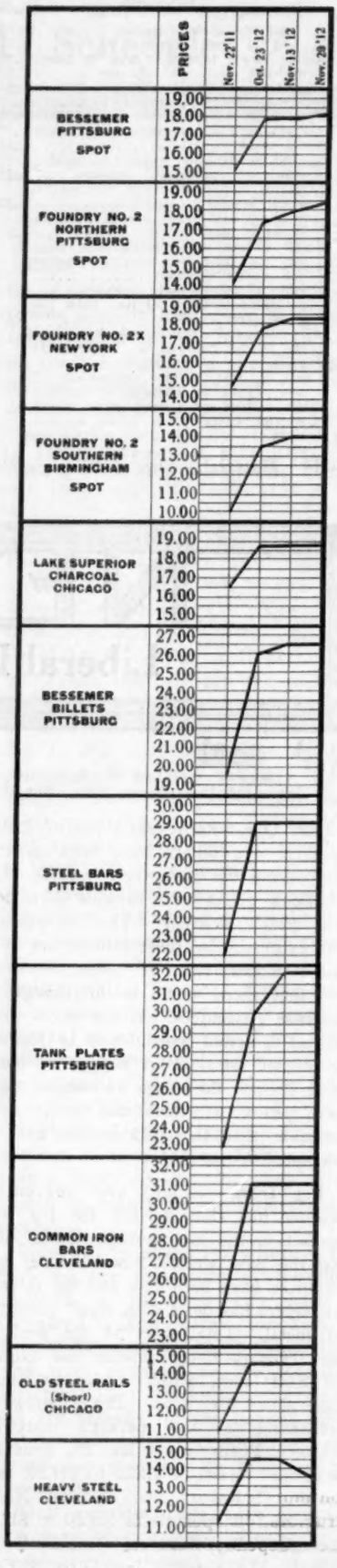
Rails and Track Material.—The heavy demand for track fastenings continues current. This has come naturally in connection with the recent active buying of steel rails. One inquiry for 14,000 tons of splice bars has been before eastern makers. An eastern rail maker has been a principal buyer of some classes of track fastenings. The rail market is quiet this week.

Cast Iron Pipe.—Eastern producers of cast iron pipe have all been advancing their schedules and are now quoting 6-inch pipe tidewater in carload lots from $24 to $26. One maker is asking a minimum price. New inquiry has quieted down considerably and the market is less active, which is not unusual at this time of the year. Bids are going in this week on 2,300 tons for the borough of Richmond.

We quote six-inch pipe at from $24 to $26, f. o. b. New York, in carload lots.

Old Material.—New business in old material has continued comparatively light and there continues more or less bearish sentiment in the market. The tone of conditions as a whole,

PRICE CHART



however, is somewhat better than a week ago. Prices show some variations in certain grades, but manifest no pronounced weakness. Confidence is expressed that the market's recovery will not be long delayed. We quote, gross tons; prices New York dealers will pay at tidewater, as follows:

Old car wheels	$13.50 to 13.75
Old iron axles	22.00 to 22.50
Steel axles	17.00 to 17.50
Old steel shafting	16.00 to 16.50
No. 1 heavy melting steel	13.00 to 13.25
No. 1 R. R. wrought	15.00 to 15.50
Wrought pipe (not galvanized)	11.25 to 11.50
Cast borings	9.50 to 10.00
Machine shop turnings	9.75 to 10.00
Heavy cast	11.75 to 12.25
R. R. malleable	10.50 to 10.75
Stove plate	9.25 to 9.50
Grate bars	8.25 to 8.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixvile, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York

BUFFALO

Furnaces Can Not Keep Up With Demand

Office of THE IRON TRADE REVIEW, Buffalo, Nov. 19.

Pig Iron. — The placement for the week was slightly less than a week ago, amounting to about 12,000 tons. Specifications continue to come in in such volume that the furnaces of the district are unable to keep up with the demand. Shipments are very heavy, in fact one of the leading producers reports that the volume of shipments is now fully 300 per cent in excess of what it was during the same period of last year. Foundries supplied from this territory have for the most part ordered out their full November quota of iron under contract and are now demanding shipment of their December quota. There is a volume of unsatisfied tonnage on the market, but the buyers not yet under cover for their requirements are showing a disposition to hold off with a view of testing the strength of the market and the possible effects of the election, together with the call for a special session of congress. Prices, however, remain absolutely rigid and several of the furnaces are adhering to the maximum of the range quoted below on practically all lines. Schedules for the week are substantially as follows, f. o. b., Buffalo:

No. 1X foundry	$17.50 to 18.00
No. 2X foundry	17.25 to 17.50
No. 2 plain	17.00 to 17.25
No. 3 foundry	17.00 to 17.25
Gray forge	16.75 to 17.00
Malleable	17.50 to 18.00
Basic	17.50 to 18.00
*Charcoal	18.75 to 21.25
*Some grades and brands	22.00

Finished Material. — Prices remain rigid, conditions firm and both the consumers and the mills of the district seem to have all the business they are able to handle. Steel bars continue to bring 1.40c, base, and structural shapes 1.50c, base, while one independent interest is now asking 1.45c, for what bar orders it is able to handle. There is a large volume of inquiry for material of all kinds seeking placement for early and immediate delivery, but finding no acceptances by the mills and agencies here, despite the offers of premiums on the tonnages. A slight falling off in specifying occurred during the week as a result of many users having booked their full requirements within the period the mills are able to take care of their orders. Mill books are not being opened beyond first quarter, as the business now entered will require the full operation of the producers through all of the second quarter, and in some instances, into the third quarter to effect deliveries. June deliveries are the rule on bar products and July dates on structural. The majority of the mills are worse off now than they were three or four months ago, although one independent interest reports it is better able to promise deliveries, where nearby shipments are not required. Wire nails are quoted here at 1.70c and 1.75c with the demand strong.

The leading local producer is operating all of its mills to full capacity and on double time within the limit of its ability to get the semi-finished steel.

Old Material. — Prices continue to remain the same as quoted last week. There is no disposition on the part of the yards to soften prices, although the volume of trading for the week was slightly less than the week before. Shipments on contract continue to go forward and while many of the consumers are watching for a favorable turn of the market, the dealers are equally certain that prices will stiffen rather than weaken because of the great activity in all other lines.

The range for the week is as follows, f. o. b. Buffalo, on gross tons:

Heavy melting steel	$14.75 to 15.25
No. 1 railroad wrought scrap	15.75 to 16.25
No. 1 R. R. and mch. cast sc'p.	14.00 to 14.50
Old steel axles	16.00 to 16.75
Iron axles	23.50 to 24.00
Car wheels	15.50 to 16.25
Railroad malleable scrap	13.75 to 14.25
Wr'ght iron and soft steel turn.	8.75 to 9.00
Cast iron borings	8.00 to 8.50
Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	15.50 to 16.00
Tank iron	10.75 to 11.25
Boiler plate, sheared	15.00 to 15.50
Pipe and tank	10.50 to 11.00
Stove plate	11.25 to 11.75
Sheet iron	7.75 to 8.25
Locomotive grate bars	11.75 to 12.25

BIRMINGHAM

Fifteen Dollars for Second Quarter

Office of THE IRON TRADE REVIEW, Birmingham, Ala., Nov. 19.

Pig Iron.—With the confirmations of a reported sale of 5,000 tons of local No. 2 foundry iron, for shipment in the second quarter of next year at $15 per ton, Birmingham, that figure is practically established as the quotation for the delivery mentioned. It is not understood that all of the furnace companies are willing to enter advanced deliveries at that price; in fact, it is understood that at least three of the leading interests are not disposed to consider any tonnage for delivery after the first quarter, but the actual trading in the past few weeks has been so light that it cannot be said with accuracy just what the situation is so far as advanced deliveries are concerned. The aggregate of sales made in the past week is probably less than 10,000 tons, and the territory covered is unusually wide. Prompt and first quarter deliveries have been the chief consideration, and with the exception of the round lot referred to above, and several lots of 500 to 750 tons each, no tonnage has been reported as entered for the first half. In the majority of recent transactions, a basis of $14 per ton at Birmingham was the price paid, with a differential of 25c per ton for the grades below No. 2 foundry. A number of 250 to 300-ton lots was sold in the week at $14.50 per ton for No. 2 foundry, with a differential of 50c per ton for No. 3 foundry, and 25c per ton for the lower grades, and small quantities of favorable brands, where deliv-

ery could be made immediately, sold at $15 per ton for No. 2 foundry.

So far, none of the furnaces scheduled to go in blast this month has been lighted. The aggregate stock as of Nov. 1 was less than 78,000 tons, and shipments so far in the month have not exceeded the daily production. However, at one large plant the stock accumulation was increased during October, which is the result of the refusal of the operator to sell at current figures. To all appearances, the trade is content to await further developments before providing such additional tonnage as is required, and the market as a whole is quiet. In certain directions, the producing interests have recently been more active in the solicitation of orders, and the probability of the shading of price for such grades as are being carried in stock by certain interests has been mentioned, but those parties most conversant with the situation are positive that the $14 Birmingham basis has been fully maintained, and that premiums are being paid in certain cases for spot deliveries. The maintenance of a $15 schedule for second quarter deliveries of course depends upon the extent to which the tonnage now under contract is delivered, and upon the prices asked by certain large interests after the additions to the production that are now under way. For prompt delivery, and shipment prior to the second quarter, the schedule of prices below is quoted, all per gross ton, f. o. b. cars at Birmingham furnaces:

For delivery during the remainder of this year and first quarter next:

No. 1 foundry	$14.50 to 15.00
No. 2 foundry	14.00 to 14.50
No. 3 foundry	13.50 to 14.00
No. 4 foundry	13.00 to 13.50
Gray forge	12.50 to 13.00
Mottled	12.00 to 12.50
Standard basic	13.50 to 14.00
Off basic	11.00 to 11.50
Standard charcoal	24.50 to 25.00

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

Old Material.—In this market particular interest is given the sale of 2,000 tons of railroad wrought scrap just made to a Cincinnati dealer. The price consideration in this transaction is not made public, but as a result of the sale, stocks have been substantially reduced and all quotations are stronger. Dealers are asking prices per gross ton, f. o. b. cars here, viz.:

Old iron axles (light)	$15.50 to 16.00
Old steel axles (light)	15.50 to 16.00
Old iron rails	15.50 to 16.00
No. R. R. wrought	13.50 to 14.00
No. 2 R. R. wrought	11.00 to 11.50
No. 1 country	9.50 to 10.00
No. 2 country	8.50 to 9.00
No. 1 machinery	11.50 to 12.00
No. 1 steel	11.50 to 12.00
Tram car wheels	11.00 to 11.50
Standard car wheels	12.50 to 13.00
Light cast and stove plate	9.50 to 10.00

METAL MARKETS

Higher Prices Follow Demand for Copper

Chicago

Nov. 19.

New Metals.—The market for new metals is stronger in this territory and an increased demand is evident in all lines.

We quote dealers' selling prices f. o. b. Chicago, as follows:

Lake copper, carload lots, 17⅝c; casting, 17¼c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 7.40c; lead, desilverized, 4.65c; sheet zinc, 9c, f. o. b. Lasalle, in car lots of 600-pound casks; pig tin, 50.17½c; Cookson's antimony, 10½c; other grades, 9½c.

Old Metals.—Very little change has taken place in the market during the week, buying continuing at a fair rate, and dealers expressing satisfaction with prevailing conditions.

We quote dealers' selling prices f. o. b. Chicago, as follows:

Copper wire, crucible shapes, 17c; copper bottoms, 14½c; heavy red brass, 13¼c; heavy yellow brass, 10¼c; No. 1 red brass borings, 12½c; No. 1 yellow brass borings, 9.25c; brass clippings, 10½c; lead pipe, 4½c; zinc scrap, 5½c; tea lead, 4c; No. 1 aluminum, 20c; No. 1 pewter, 36c; block tin pipe, 47c; tin foil, 40c; linotype dross, 3½c; stereotype plates, 4c; stereotype dross, 3.50c; prime slab zinc dross, $131 a ton.

New York

Nov. 19.

Copper.—Steady improvement in demand from both domestic and foreign consumers during the past week has advanced the general market to 17.87½c for lake, 17.75c, delivered 30 days, for electrolytic, and 17.50c for casting. Leading producers who held at these figures during the period of dullness and decline in prices following the European war developments, report important sales of the metal recently made at these levels. The decline in foreign visible stocks, of about 2,000 tons during the first half of November indicates that consumption abroad has not suffered because of the conflict in southeastern Europe. The total of European visible copper as of Nov. 15, is 41,280 tons. Exports continue light, the aggregate since Nov. 1 being only 8,657 tons.

Tin.—Prices have been firm during the past week and a fair amount of business has taken place at from 49.87½c to 50.25c. With the near approach of the Banca auction, buyers are cautious. At the close of business today prices had receded to about where they were Nov. 12. Spot and November closed at 49.75c and December at 49.80c. Arrivals since Nov. 1 aggregate 2,426 tons and there are 1,445 tons afloat.

Lead. — Conpetition for business has produced rather irregular quotations. The leading sellers continue to quote 4.75c for shipments to this territory, but some of the independent sellers report sales as low as 4.67½c in New York.

Spelter.—The market closed firm today, and about 7½ points above last week's closing price. Prime western is 7.50c in New York and selling agencies report a good demand. It is said that some sellers are well supplied with contracts up to April, 1913.

Antimony.—The market has become dull again and domestic sellers are offering antimony well under the import prices. Cookson's is 10.25c; Hallett's is 9.75c, and Chinese and Hungarian are from 9.25c to 9.37½c.

Important Suit Won By Vulcan Company

The long litigation between the Vulcan Detinning Co. and the American Can Co. over the use of a secret process of recovering tin from scrap, has finally been decided in favor of the former by a decision of the Court of Errors and Appeals of New Jersey. Under the decision, the Vulcan company will recover from the American Can Co. from $500,000 to $600,000 representing the profits of its detinning works at which the Vulcan's secret process was employed. These plants were permanently closed by injunction several years ago and the judgment rendered represents the profits accruing in their four years' operation prior to the suit. The decree allows the American Can Co. credit for the value of its useless detinning plants, of money for repairs, insurance and taxation expended. The suit has been in the courts for five years.

According to advices from Jackson, O., the plant of the Crown Pipe & Foundry Co., that city, which was almost totally destroyed by fire a few weeks ago, will be rebuilt.

Government Witness Causes a Stormy Session

At Steel Corporation Hearing and Federal Court at Philadelphia is Appealed to—Dr. Walker on the Stand

Office of THE IRON TRADE REVIEW,
501 Metropolitan Bank Bldg.,
Washington, Nov. 19.

The examination of witnesses in the suit of the government for the dissolution of the United States Steel Corporation was resumed here this morning following a recess of 20 days since the adjournment in Pittsburgh. The hearings are being held in the room of the United States commerce court, in the Southern building, these quarters being much more pretentious than those which were available either in New York or Pittsburgh.

The first witness to be examined was Dr. Francis Walker, deputy commissioner of the bureau of corporations, who was questioned by Judge Dickinson. Dr. Walker first told of the various activities he has been engaged in and the various institutions at which he has been awarded academical and other degrees. He was then asked to mention the various sources which he had consulted in gathering data for his report on the Steel Corporation. The witness explained that he had secured most of his information from the reliable trade papers and from the minutes and records of the various companies.

Walker as a Lecturer

In reply to further questions by Judge Dickinson, Dr. Walker then went into the history of the iron and steel industry. His manner of testifying was somewhat along the lines of a lecture, and he made copious use of such phrases as "illegal monopolistic combinations", etc., until Mr. Lindabury objected on the ground that the witness' language was entirely uncalled for.

"Well, I can't put his language through a sifter," said Judge Dickinson.

"I also object to the witness' testimony on the ground that it is purely hearsay, opinionated and argumentative."

"Well, you have a right to object as much as you want to," said Judge Dickinson, "but I do not see how we can put the witness in a straightjacket."

Dr. Walker then produced a large number of tables and charts which, he said, showed the price movements of various iron and steel products during the past two decades. These he presented with a great wealth of explanation of the kind Mr. Lindabury classed as "opinionated and argumentative", until the latter threatened to call an adjournment in order to submit the witness' testimony to the court in Philadelphia.

School Boy Could See

"This man," he said, "is hired to come here as a witness and, as any school boy could see, he is delivering only opinions and making arguments."

"I beg your pardon," said Dr. Walker, growing red with anger, "I am not hired. In fact, I refused to testify until ordered to do so by my superior officer, Mr. Nagle."

"Well, I think it is an imposition for the department of justice to induce a witness, through the department of commerce and labor, to come here and submit this kind of testimony and I propose that we take the matter up immediately before the court in Philadelphia."

Judge Dickinson at once jumped to his feet and came to the defense of the department. The witness, he said, had not been induced to appear through any desire by the department of justice to have him render any certain line of testimony. The department, he said, had had no knowledge beforehand of what Dr. Walker would testify. The judge then sat down with a glare.

Lawyers Confer

Following a conference on the part of the counsel for the defense, Mr. Lindabury applied to John A. Brown, sitting as the master in place of his father, for an immediate adjournment until Thursday morning, in order that the testimony of Dr. Walker might be submitted to the district court in Philadelphia tomorrow morning. As Judge Dickinson, however, was in favor of continuing the examination of the witness, Mr. Brown decided to take an adjournment at the close of the day. He was of the opinion that this would not harm the counsel for the defense, as that side might fully protect itself by entering objections. This, by the way, was the first time that the master has been called upon to make a ruling in this case.

Judge Dickinson then proceeded to question the witness further regarding the price movements of beams, tank plates, etc., thus bringing out that prices changed at least once a month prior to the organization of the Steel Corporation and its subsidiaries, while since 1901 they have shown greater stability. The inference to be drawn from this testimony, of course, was that competition has not been as strenuous since 1901 as before that date.

The witness' statements were objected to on the ground that the period covered in the questions was that prior to the organization of any of the Steel Corporation subsidiaries and hence had no bearing on the case. Mr. Severance also objected on the ground that Dr. Walker's oral testimony conflicted with the data indicated on his tables and diagrams. This objection was in turn excepted to by Judge Dickinson, who was highly indignant at the comments made by the Steel Corporation attorneys regarding Dr. Walker's testimony.

"When we go to Philadelphia tomorrow," said the judge, "I propose to take up with the court the personal remarks indulged in by counsel for the defense at the expense of the witnesses."

"Yes, judge," replied Mr. Lindabury, "we will take up the conduct of the entire case."

Contract for Rails

Detroit, Mich., Nov. 19.—The contract for 10,000 tons of steel rails to be used on the new interurban line between Grand Rapids and Kalamazoo has been awarded to the Illinois Steel Co., through its Detroit office. Delivery is to be made in January, 1913. The Hodenpyl-Hardy interests, of New York City, which control the Commonwealth Power Co. and the Michigan United Railways, are adding the new branch to their already extensive lines.

Th Globe furnace of the Globe Furnace Co., Jackson, O., which is practically being rebuilt, will not blow in until next June.

BRISK ORE SELLING

Underway on Newly Adopted Schedule of Prices for 1913.

Iron ore prices for 1913 delivery have been established on the basis of 10 cents lower than the 1911 rate and are, therefore, from 55 to 65 cents a ton higher than 1912 prices. Between 4,000,000 and 5,000,000 tons of ore have been sold on this basis. The block is large enough to make the market and undoubtedly all the other producers will follow suit. The price was established by Pickands, Mather & Co., and was immediately followed by the Cleveland-Cliffs Iron Co. and M. A. Hanna & Co. The price was established without a meeting of any kind, though there has been much informal discussion on the subject during the past three weeks. Furnace interests felt that the situation justified an advance and had suggested 50 cents, while some of the producers felt that the cut of 75 cents made at the beginning of the season should be restored. Others believed in analyzing the various phases contributing to make the situation, that a compromise between these two figures should be reached and that is what has actually been done. The price works out at 10 cents lower than the 1911 schedule. The guarantee of iron content will remain the same, 51.50 per cent for non-Bessemer and 55 per cent for Bessemer. It will be recalled that the rail rate from the Mesabi and Vermillion mines was placed at the flat rate of 60 cents at the close of last season, being a reduction of from 20 to 40 cents, according to the shipping point, though the great bulk of the ore was moved at the 80-cent rate. Some of the large consumers of ore felt that they should derive some benefit from the reduction in the rail rate and apparently the producers thought so also. The furnacemen have been in the market for weeks making reservations and practically all of the desirable ores have already been covered. Undoubtedly the bulk of the ore for 1913 delivery will be sold before the close of the year. A similar situation has not existed since 1906, when all the ore that the producing companies could promise to deliver was sold in November.

Operating expenses will be somewhat higher in the ore trade next year than they were this, and considering that pig iron is now selling much higher than it did last spring, the advance in ore prices is justified and appears to have been determined in a spirit of eminent fairness. The lake freight rate will be somewhat higher next year, but whether it will be 5 cents or 10 cents is yet to be determined.

CONSERVATIVE POLICY

Will be Rigidly Adhered to by Steel Corporation.

New York, Nov. 20. (By wire.)—Announcement is made by officials of the United States Steel Corporation here that it has made no change in the schedules on heavy lines of finished materials which remain 1.45c, Pittsburgh, for plates and shapes and 1.40c for steel bars. It is stated that the orders of customers for delivery throughout all of the year 1913 will continue to be accepted at these figures. The policy of the leading interest, it is stated, remains in force to give no support in its schedules to further advances in these lines because it is endeavoring to maintain stability and an extension of present prosperous conditions.

Sales of Steel Making Iron

Pittsburgh, Nov. 20. (By wire.)—A sale of 10,000 tons of Bessemer iron for first quarter delivery to a local interest was made early this week at $17.25, valley, which is now considered the minimum price for Bessemer. According to advice today, the Jones & Laughlin Steel Co. obtained 15,000 tons instead of 10,000 tons of basic about a week ago. Considerable demand for gray forge is reported and sellers are refusing to shade $16.50, valley.

Steel Axles Advanced

Pittsburgh, Nov. 20. (By wire.)—Makers of standard carbon steel axles have advanced quotations $1 a ton and are now quoting at a range from 1.70c to 1.75c. Quotations are $2 a ton above the minimum price of a few weeks ago. The cost of raw material is responsible for the advance.

Dickson Will Head Pump Company

New York, Nov. 20. (By wire.)—W. B. Dickson, formerly vice president of the United States Steel Corporation, has been elected president of the International Steam Pump Co., succeeding the late Benjamin Guggenheim, who was lost on the Titanic.

CONCLUDE HEARING

In Complaint of Pittsburgh Steel Co. Against Ore Rate.

Washington, D. C., Nov. 19.—The hearing in the complaint filed before the Interstate Commerce Commission by the Pittsburgh Steel Co., Pittsburgh, against the railroad ore carrying tariffs from lower lake ports, was concluded this morning when the defendants filed the annual report of the complaining company to its stockholders for the year ending June 30, 1912, as well as a copy of its statement to the stock listing committee of the New York stock exchange and exhibits showing the increase in population of the Chicago, Cleveland, Columbus, Wheeling, Pittsburgh and Johnstown, Pa., districts between 1900 and 1910. These were introduced to indicate that these districts prospered and showed great increases in population during that decade.

Will Enlarge Shops

A considerable enlargement of its steel car building facilities at its Roanoke, Va., shops is in contemplation by the Norfolk & Western railroad. When the improvements are completed, the shops will have a daily capacity of 20 steel cars and it is aimed by the railroad to build at this plant its full requirements of freight equipment, which in part it has been accustomed to purchase in the open market. This road is now inquiring for a heavy tonnage of finished steel products to cover its large car building requirements over the six months of March to October inclusive.

Blast Furnace Changes

The No. 2 Crozer stack of the Virginia Iron, Coal & Coke Co., at Roanoke, Va., has been disabled by the caving in of the top and is now out of blast. The stack will probably be idle for some weeks undergoing repairs.

One of the furnace group of the Bethlehem Steel Co., at South Bethlehem, Pa., which has been working badly, was forced out this week.

The Pennsylvania Steel Co. is figuring upon blowing in at some time in the near future its large No. 3 furnace, at Lebanon, Pa. The No. 1 furnace of this plant is now operating.

The high silicon furnace of the Star Furnace Co., Jackson, O., which is being rebuilt, will be relighted in February. The output of this furnace is sold by Rogers, Brown & Co., Buffalo.

Electric Furnace Methods of Steel Production---II

A Discussion of the Stassano Furnace and Process, Including Its Advantages and Disadvantages, Cost of Operation, etc.

By John B C Kershaw

Major Ernesto Stassano, of the Italian army, appears to have been the first electrometallurgist to apply electric heating, on a practical scale, to the smelting and refining of iron and steel. His first English patent covering an electrically-heated furnace for producing, in one operation, steel direct from iron ore, was issued in 1898, and experimental trials were commenced with this furnace at Rome in 1899. Fig. 4 shows a sectional elevation of this earliest form of steel refining furnace. Although this design was soon discarded by the inventor, it is interesting to note that it closely followed the design of the blast furnace and this type of construction has been adopted in the successful electric iron smelting furnaces of Gronwall and Heroult, now operating in Norway and in California.[1]

Early Experiments

Stassano's attempts to produce steel direct from the ore in one operation, were doomed to failure and the trials of the process and furnace at Darfo, in northern Italy, in the period from 1900 to 1902, led to no practical or financial success. The Italian government, however, became interested in the furnace and instituted experiments for refining the special brands of mild steel used for manufacturing shells and ammunition, at the Royal Arsenal, Turin, the first 250-kilowatt Stassano furnace having been erected at that place in 1903.

Since that year, the electric method of refining the mild steel used for shells, has been in continuous operation by the Italian military authorities at Turin. A new company, the Forni-Termo-ellettrici Stassano, also was formed in 1905 to take over the assets of the earlier company and electric steel works were planned and partially erected at Turin. This plant was equipped with six furnaces, ranging from 100 to 1,000-horsepower capacity and produced, chiefly, steel axles for automobiles, passenger and freight cars. The venture was not a financial success, and in 1909 a portion of the electric furnace plant was transferred to the works of the Elba Co. at Portferraio, and the remainder to the works of the Milan Steel Co. In the light of the later developments of electric steel refining, it would appear that this early attempt to operate a steel plant entirely by electricity was somewhat premature, and that even today, with seven years' additional experience in electric steel refining, there are comparatively few places in the world where a similar undertaking could be carried on with commercial success.

The Stassano electric steel refining furnace has proved successful when used in units of 250 kilowatts and is adapted as a refining and melting

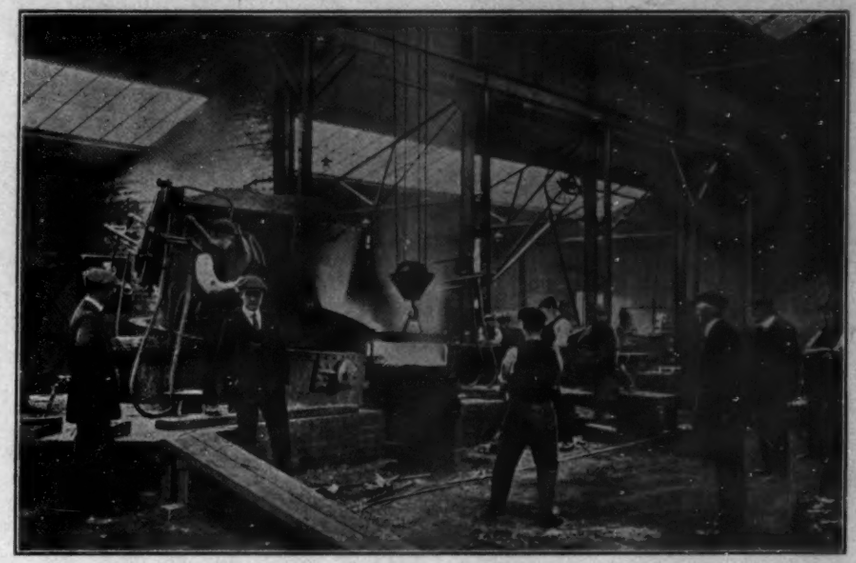


FIG. 2—STASSANO FURNACE IN THE ELECTROFLEX CO.'S PLANT IN POURING POSITION

FIG. 1—THE STASSANO FURNACES IN THE PLANT OF THE ELECTROFLEX STEEL CO., DUNSTON-ON-TYNE, ENG. THE FURNACE AT THE RIGHT IS IN MELTING POSITION

[1] The Iron Trade Review, Jan. 4, 1912.

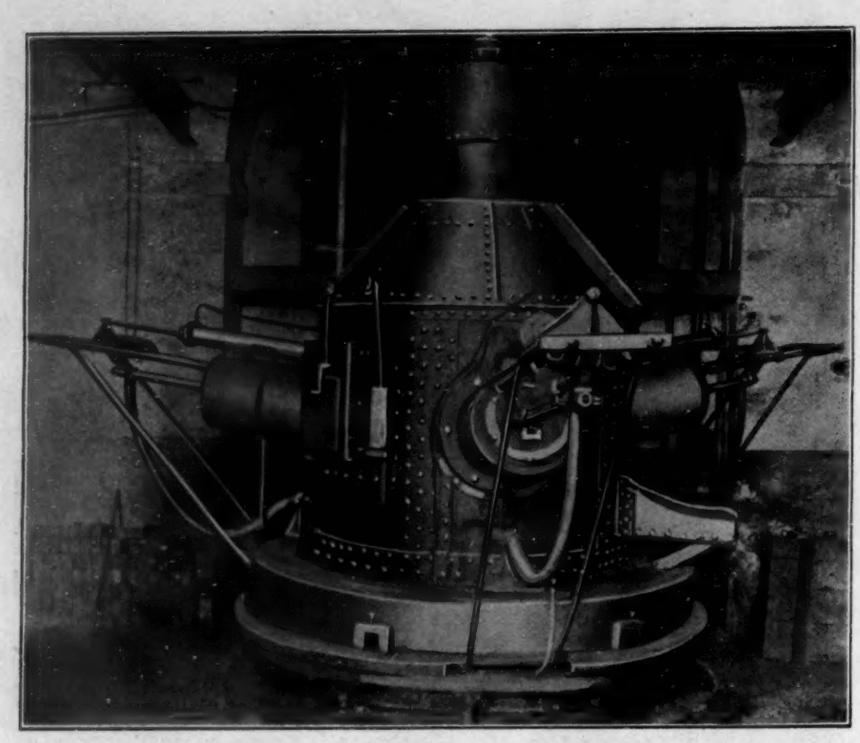


FIG. 3—THE STASSANO ROTARY FURNACE AT THE ROYAL ARSENAL, TURIN

furnace in steel foundries where small and intricate castings form the chief portion of the output. A large number of these small furnaces, producing one ton of steel per charge, is now in operation, or in course of erection, in various parts of the world.

The power consumption of the Stassano furnace, per ton of steel produced, according to the available figures, appears to be higher than that of the Heroult and Girod types, and although in the smaller furnaces, this disparity is not of so great importance on account of the comparatively high selling price of the steel castings produced, it becomes a considerable handicap when the cheaper varieties of rolled steel are to be manufactured. Owing to the great power cost per ton of steel produced, the 1,000 - horsepower Stassano furnaces erected at the Forni-Termo-ellettrici Stassano Works at Turin did not prove very successful, and so far as the writer is aware, no Stassano electric refining furnace of this size and type is now under construction. As regards the smaller furnaces, between 10 and 20 are in operation or in course of erection in the leading steel producing countries.

The Stassano furnace is of the arc type, and the special feature which differentiates it from all other electric arc furnaces for iron and steel refining, is the application of the rotary principle to obtain a better mixture of the charged materials and a more uniform heating effect. This design was protected by an English patent in 1902.

Fig. 7 shows sectional views of the rotary furnace, which consists of a sheet iron cylinder with a conical roof, lined on the inside with refractory material. The melting chamber is also cylindrical, with a cupola of fire brick. Suitable openings are provided for the electrodes, which project toward the center of the furnace, their ends being at proper distances from each other for the formation of the arcs and at a convenient height above the bottom.

The electrodes are protected on the outside by water-cooled cast iron cylinders, fitted to the mantle of the furnace. The movement of the electrodes is controlled by guide-rods outside of the furnace. To the end of each carbon electrode a metallic rod is attached, the end of which is connected to a flexible cable leading underneath the furnace to the slip-rings for current supply.

Above each of the water-cooled cylinders which protect the outside of the electrodes, a small hydraulic cylinder is provided. The piston rod is connected with the metallic rod of the electrodes, and controls the movement of the electrodes, thus regulating the distance between their terminals within the furnace.

The lower part of the furnace is surrounded by an L-shaped, cast iron rail, operating upon conical rolls. Below the rolls, there is another cast iron rail, resting on the inclined top of the pit wall, thus forming the support of the furnace. The longitudinal axis of the furnace is, therefore, slightly inclined from the vertical.

Revolving the Furnace

The furnace is revolved by a set of gears and attached to the head wheel are insulated copper rings which, by means of copper bars and elastic cables, transmit the current to the electrodes. The current is supplied from the generator to a series of brushes, disposed around the top of an iron support in the center of

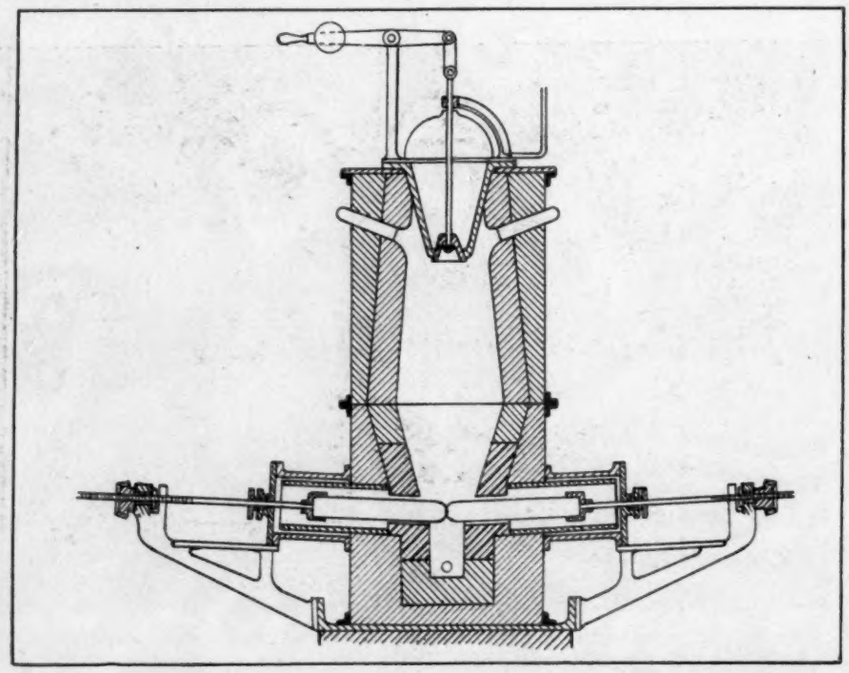


FIG. 4—SECTIONAL VIEW OF THE EARLIEST TYPE, STASSANO FURNACE

the pit and cables. These brushes and slip-rings maintain a continuous connection between the generator and the electrodes, while the furnace is either stationary or rotating. In addition to the brushes a valve is mounted on the top of the stationary iron support, which distributes the water for the pressure regulators and for the cooling cylinders protecting the electrodes.

The discharge is at the bottom of the melting chamber, while opposite to it another opening is left for charging. In the center of the brick cupola, an outlet is provided for the volatile products of the furnace reactions. Through this opening the gases escape into a metal tube shut by a sand valve, and leading to a vessel filled with water, from which the gases may escape into the open air. This arrangement prevents air from entering the melting chamber. No air can enter the opening for charging or the tap hole, since the pressure inside of the furnace is higher than atmospheric pressure, on account of the higher tension of the gases at the elevated temperature inside.

Essential Requirements Fulfilled

It is claimed by Stassano that this design fulfills satisfactorily the three essential conditions of good work in electric steel refining, namely, a neutral atmosphere in the melting chamber; highest possible arc temperature and a good admixture of the molten materials without contact with the electrodes.

Table I gives the results obtained with the 200 and 1,000-horsepower rotary furnaces at Turin, including the average power consumption and output per charge, for the different classes of steel produced.

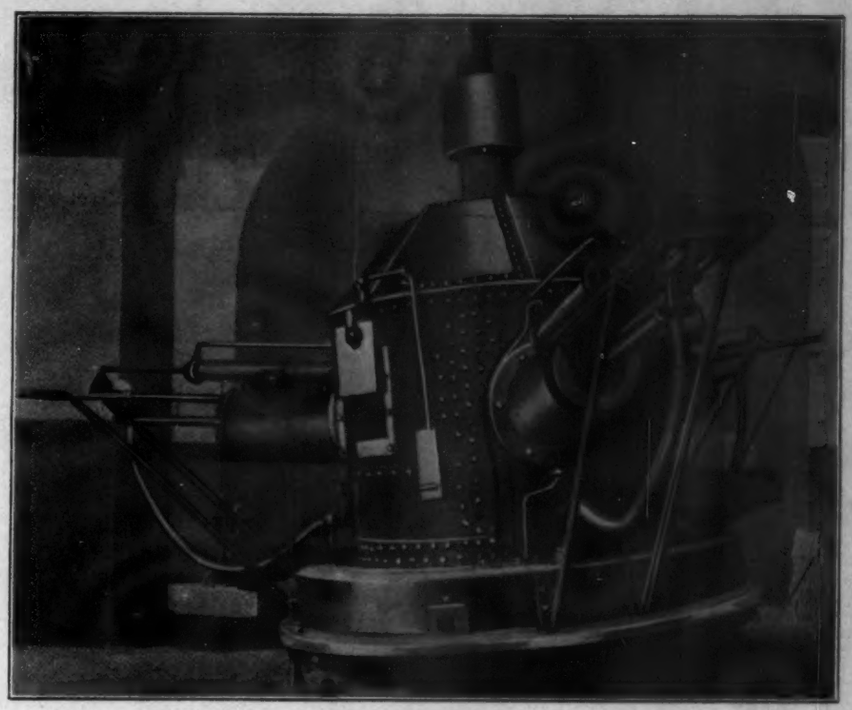


FIG. 6—ANOTHER VIEW OF THE STASSANO FURNACE AT TURIN

Table I.

RESULTS OBTAINED WITH 200-HORSEPOWER FURNACE AT TURIN

Product.	Power consumption, kilowatt-hours per metric ton:	Output, kgs.
Steel for projectiles.....	1,250	653
Mild steel for castings..	1,260	730

RESULTS OBTAINED WITH 1,000-HORSEPOWER FURNACE

Steel ingots for projec.	958	3,900

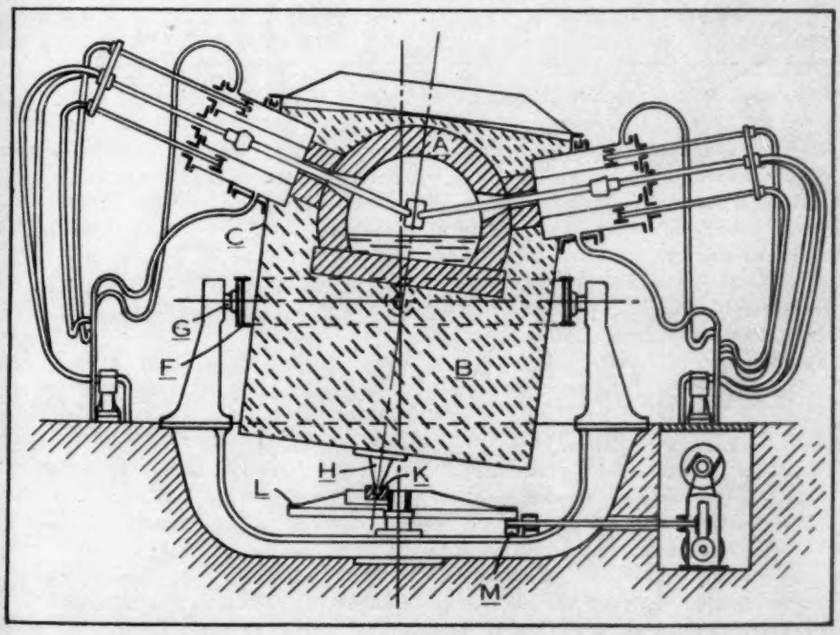


FIG. 5—SECTIONAL VIEW OF LATEST TYPE OF STASSANO FURNACE

The percentage of the scrap recovered as steel, in the Stassano type of furnace is unusually high, owing to the exclusion of air from the melting chamber and the consequent absence of any loss from oxidation during the refining process. In melts where the charge and output have been weighed, the loss due to oxidation was only 1½ per cent.

As regards the cost of working, the trials at Turin yielded the following figures, per ton of steel produced:

Electrodes, 10 kgs.....	$0.60
Refractory materials .....$1.93 to	2.90
Wages for 3 men.....	2.38
Water for cooling purposes.....	0.12
Total .....$5.03 to	$6.00

An estimate based on the results obtained at an installation at Bonn, Germany, gave the following figures:

COST PER METRIC TON OF CAST STEEL.

Raw materials, including additions of chromium to finished steel..	$16.66
Electric current (1.071 cents per K. W.-hour)	10.71
Refractory materials for linings...	2.85
Labor	2.38
Interest and depreciation.....	1.19
Electrodes	0.60
Water for cooling purposes.....	0.12
	$34.51

New Type of Stassano Furnace

The new Stassano furnace combines the advantages of both the rotary and tilting types. As shown in Figs. 5 and 8, the furnace comprises a casing of sheet iron or other material, enclosing a melting chamber, *A*, Fig. 5, made of refractory material, which has, in the case of small furnaces, the form of a hollow sphere with the lower portion thereof cut

away by a plane constituting the bottom of the furnace, while in furnaces of large dimensions, the interior cavity has preferably the form of an ellipsoid with the bottom similarly formed in the lower portion. This form of furnace chamber has the advantage that the walls of refractory material are rendered more resisting and are reinforced by a filling or envelope, *B*, of refractory earth, and at the same time the chamber serves to reverberate better onto the charge, the heat emanating from the arc or arcs. The arrangement of the electrodes and their control follows closely the design of the earlier furnace.

The mounting of the furnace is effected as follows: At two diametrically opposite points of the casing, *C*, wheel is rotated by teeth on its periphery engaging a pinion, *M*, operated by a shaft driven by a small electric motor.

By turning the wheel, *L*, on its axis, the pivot, *H*, is displaced in a circle so that the axis of the furnace traces out a cone with a circular base. This movement, by reason of the double suspension of the chamber, imparts a rotative movement to the molten mass contained in chamber, *A*, which may be continuous or intermittent, corresponding to the motion of the wheel, *L*. The wheel can, if necessary, be turned alternately in different directions.

By this ingenious method of suspension the furnace body oscillates only on the points *D* and *G*, and can be subjected at will, either to a rotary or to a tilting movement. No figures

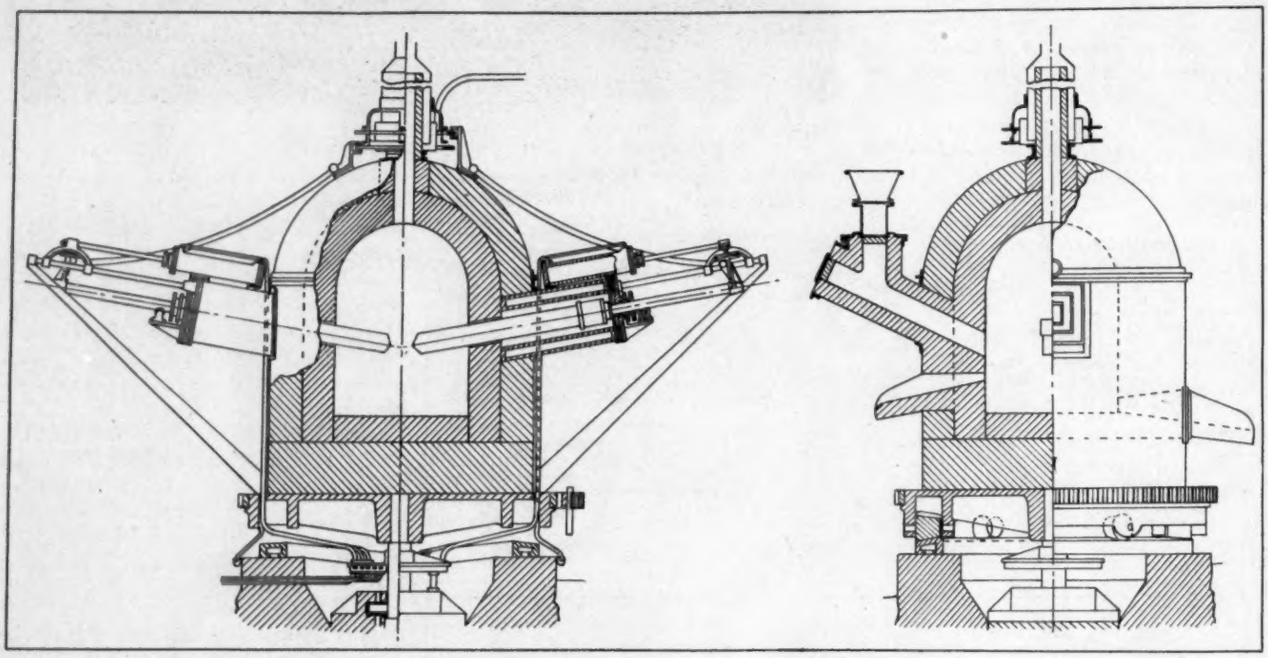


FIG. 7—SECTIONAL VIEWS OF DIFFERENT TYPES OF STASSANO FURNACES

Fig. 5, are two pivots, *D*, Fig. 8, mounted in two supports, *E*, rigidly connected with a ring, *F*, encircling the casing, and having two pivots, *G*, arranged at 90 degrees with respect to the pivots, *D*. The pivots, *G*, are supported by standards which are connected by a stirrup passing below the bottom of the furnace.

From this construction it is apparent that the furnace chamber is so suspended that it can be inclined at any angle. The casing, *C*, has depending from its bottom, a pivot, *H*, Fig. 5, the axis of which coincides with that of the casing. The end of this pivot is rounded and has a bearing in a groove or socket formed in a member, *K*, adjustably mounted on a spoke of a wheel, *L*, journaled on the stirrup. This

are yet available showing the power consumption or costs of operating this new type of furnace, although these soon will be available, as three furnaces of this type are now being erected at the works of the Electro-flex Steel Co., at Dunston-on-Tyne, near Newcastle, Eng.; one in Russia and another in Austria.

Stassano Furnaces in Operation

As regards the total number of Stassano furnaces now operating, a comparative table of the electric furnaces installed and compiled by the Grondal-Kjellin Co. three years ago, gave the number of Stassano furnaces, at that date, as 11 and the aggregate capacity as 16.90 tons of steel per day. If we add to this the five furnaces referred to, we obtain a total of 16 furnaces, with a daily capacity of 24 tons of finished steel.

A 250-horsepower furnace of the older type was installed in the Bonner Fraser Fabrik, Bonn-on-Rhine, Germany, in 1908. This furnace is operated by three-phase current supplied from the generating station of the Berggeist-Bruhl electric plant. The current is supplied at a pressure of 5,000 volts and this is reduced to 100 volts between the two phases by a transformer placed near the furnace. The cost of the current, at the furnace terminals, is 1.071 cents per kilowatt-hour. The raw material used at these works consists of steel clippings, turnings, and miscellaneous scrap, costing from $14.28 to $15.47 per metric ton; 3½ hours are required to produce complete fusion and 1½ hours additional are consumed in the refining operation. This is equal to 5 hours per charge of metal cast.

The entire charge of refined metal is poured from the furnace and is used for high grade steel castings. The average composition of the steel is carbon, 0.08 to 0.18 per cent; sulphur, 0.03 per cent, and phosphorus, 0.06 per cent. Occasionally castings of tool steel quality are produced containing 0.70 to 1.30 per cent carbon, with or without the addition of nickel, chromium or tungsten.

Although the Stassano Electric Furnace Co. was not a financial success, some details of the equipment of the works at Turin, may be of in-

terest. The plant was supplied with three-phase current at 21,500 volts, which was reduced by transformers to the voltage required for working the furnaces. These six furnaces were of the following sizes and type:

Horsepower—Current.	Voltage.	Amperes.
2 at 100, single phase..	75	1,000
2 at 200, three-phase....	100	900
2 at 1,000, three-phase..	150	2,700

Furnace in Austria

The Weicheisen - Stahlgiesserei L. Gasser at St. Polten, Austria, has operated a 250-horsepower Stassano furnace of the older type since September, 1909. The current supply is furnished by a municipal power plant and no difficulty has been experienced in running the furnace in parallel with the lighting system. The raw material used for charging the furnace consists of 15 per cent hard steel scrap and 85 per cent of wrought iron turnings, etc. The power consumption averaged 1,010-kilowatt-hours per ton of material charged, in the early trials of the furnace. No doubt this figure has been reduced, as more experience has been gained in the use of the furnace, but no later data are available.

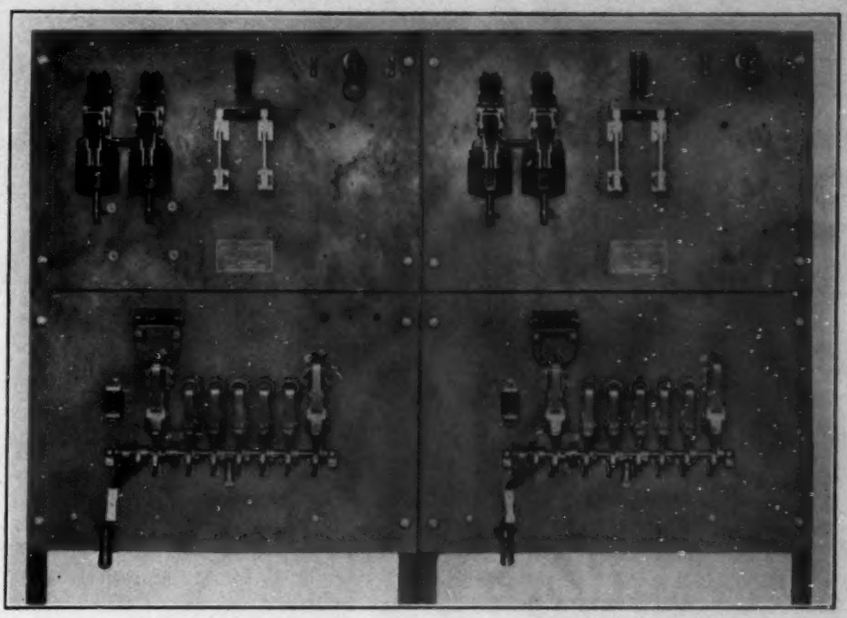
In a paper read before the Iron and Steel Institute by M. Catani in October, 1911, a large number of tests of Stassano steel were reported. The analyses of steel made for castings in one of these electric furnaces, follow:

No. 1.—Carbon, 0.235 per cent; silicon, 0.195 per cent; sulphur, 0.047 per cent; phosphorus, 0.031 per cent, and manganese, 0.546 per cent.

No. 2—Carbon, 0.207 per cent; silicon, 0.236 per cent; sulphur, 0.043 per cent; phosphorus, 0.027 per cent, and manganese, 0.421 per cent.

No. 3.—Carbon, 0.36 per cent; silicon, 0.140 per cent; sulphur, 0.052 per cent; phosphorus, 0.036 per cent, and manganese, 0.486 per cent.

These furnaces also are adapted for making special steels, such as nickel, tungsten, chrome, etc.



MANUALLY-OPERATED PANELS FOR STARTING FIRE PUMPS

Manually-Operated Starters for Fire Pumps

The requirements of all underwriters' boards are not the same and panels for the control of electrically-operated fire pumps are accordingly manufactured with different objects in view. The accompanying illustration shows a duplex panel for starting manually, two 125-horsepower, 220-volt fire pump motors, built by the Cutler-Hammer Mfg. Co., Milwaukee. In a complete installation the entire panel is enclosed in a splash-proof ventilated case with doors and a removable back. The bottom of the panel must be at least 2 feet above the floor, and although automatic and overhead release are provided, no fuses are placed in the operating circuit. No fiber parts are used, there are no iron-to-iron bearings and all iron or steel parts are either copper - plated or enameled. The operation is of the single lever type, with butt-accelerating contacts. A pilot switch is placed above the meter. The latter is not shown in the illustration, but is used to indicate the voltage of the line supply. The resistance is mounted on the backs of the panels and is enclosed. The connections, terminals, etc., are of more liberal capacity than are found on control panels that are used for other than fire protection.

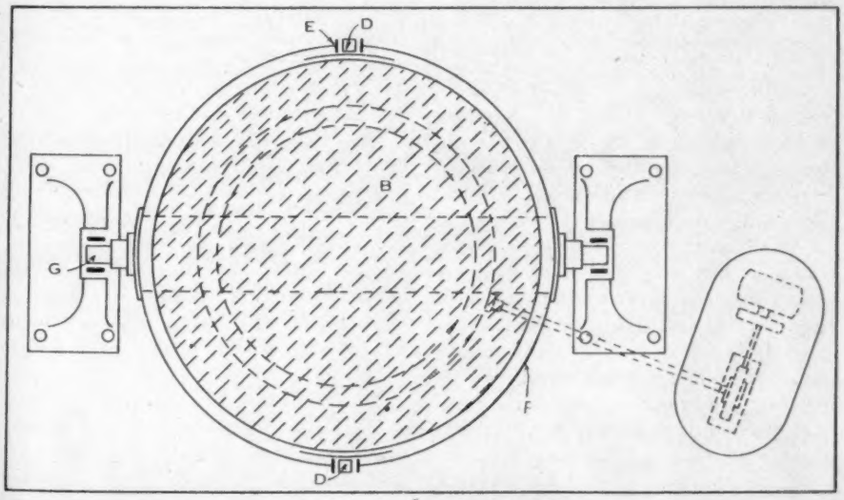


FIG. 8—PLAN VIEW OF LATEST TYPE OF STASSANO FURNACE

Canadian Plant for Plumbers' Supplies

The Canadian plant of the Mueller Mfg. Co., Decatur, Ill., which is being built at Sarnia, Ont., will shortly be placed in operation. The Canadian company is known as the H. Mueller Mfg. Co., Ltd., and the officers follow: O. B. Mueller, president and general manager; C. G. Heiby, vice president and superintendent; Adolph Mueller, treasurer, and Fred L. Riggin, secretary, assistant treasurer and assistant general manager. The site comprises 73 acres and the buildings in course of erection include a foundry, 60 x 190 feet, and a brass finishing department, 60 x 256 feet. Richard Lau has been appointed foreman of the foundry and W. C. McIntyre has been appointed superintendent of the plating and polishing department.

Effect of Carbon on Quality of Charcoal Iron[1]

Results of an Investigation of Lake Superior Charcoal Irons—Differences Between Analyses and Physical Properties—Causes of Spotted Iron

By J E Johnson Jr

Charcoal iron is so unimportant, quantitatively, compared with coke iron, that its qualitative importance for many purposes is unknown to many operators of coke furnaces. The objects of this paper are to explain this qualitative importance and some of the factors that affect the quality, and a brief review of the commercial conditions governing the charcoal iron industry is a necessary preliminary to an adequate treatment of the subject. When the advent of coke iron transformed the whole iron industry commercially it left intact a limited production of charcoal iron in the east and south, and this production has always been conducted on a basis of high quality and high cost, with a correspondingly high selling price. In the northwest and particularly the Lake Superior district, the development has been along different lines. The close proximity of the iron ore deposits and the great forests of that region were responsible for this.

Large Northern Furnaces

When the white pine forests were removed, large areas of hardwood and hemlock were left behind and the abundant supply of both iron ore and hardwood, which makes an excellent charcoal, made feasible the establishment of furnaces capable of greater outputs than prevailed at the southern and eastern furnaces. The recovery of the by-products in the production of charcoal, progressed with the developments in the charcoal iron industry. First, wood alcohol, and then acetate of lime were recovered, acetic acid and acetone being made from the latter. The consumption of these products became so great that it led to the construction of wood-carbonizing plants, in which the so-called by-products became the principal object and charcoal the real by-product. In the early days, the by-products would pay for the wood from which they came. The easiest way to utilize the charcoal was to build and operate a furnace as an adjunct to the chemical plant. In this way, many plants were operated by men with a limited knowledge of the iron business, and in their efforts to learn, they drew their information from the coke iron trade, which strove for high production.

Economies were introduced, that were not possible in the smaller plants in the south and east, among these being the hot blast. The iron was sold for what it would bring, and since the fuel cost was relatively low, the iron could be sold at low prices compared with the southern and eastern charcoal iron, where the by-product industry had not been developed to any extent. Commercial pressure finally forced this price down to a ridiculously low figure. In the summer of 1910, when the Lake Superior Iron & Chemical Co., of New York, was organized to take over six plants in the Lake Superior region, the price of warm-blast southern and eastern irons ranged from $23 to $33 per ton at the furnace, with a ready sale for all that could be made, whereas Lake Superior charcoal irons were a drug on the market at from $14 to $16 per ton. William Wilkins, general superintendent of the iron department of this company, determined to find the reason for this discrepancy in price and to remove the cause if it was in the actual value of the iron. An investigation was, therefore, undertaken at the Ashland plant, Ashland, Wis., of which I at that time was appointed manager, to find the conditions affecting the quality.

Foundries Used Chemical Analyses

An investigation of the consumption showed that there were foundries using chemistry not only for silicons and sulphurs, but also for carbon determinations and advanced work of that kind. Such foundries had found, by irrefutable tests, that they could take a certain iron of a given analysis and produce certain results with it in chill, depth and uniform interlacing of chill with gray, hardness and toughness of chill combined, with corresponding resistance to abrasion, freedom from pits and from local failures of various kinds. This was true not only of charcoal iron as compared with coke, but of one charcoal iron and another. Some car wheel manufacturers produced wheels that would give service of many thousand miles in excess of that given by other wheels of their own make, that were made for purchasers who insisted on low price rather than quality. We were shown pieces of castings which contained ocular evidence that there were physical variations not dependent on similarity of analyses in any recognized element. As a result of these conditions, branches of the foundry trade have grown up, that form a relatively small fraction of the whole, but which are of enormous commercial importance nevertheless, and whose whole product is based on ability to secure and to use irons which give qualities beyond those obtainable from the ordinary coke foundry irons. These branches are particularly the manufacturers of chilled rolls and of chilled car wheels, though there is a growing demand for irons of high strength and close grain, without great chilling qualities, for many purposes, notably gas engine cylinders and similar castings.

Long and Difficult Investigation

The present investigation has been underway for two years. In that time we have proven to be true many things which we did not believe, and have proven to be untrue many things of which we were firmly convinced, but we do not yet consider that we are within measurable distance of the final solution of the great problem: Why one iron should be so different from another of the same analysis. But experiments on the furnaces have indicated methods whereby the quality of the iron may be vastly improved from the state of things described. Practically all of our furnaces have been rebuilt to embody the results of the investigation to date. In the course of the investigation we have come upon what seems to me the explanation of a phenomenon which has puzzled many, iron with a white or close spot in the center.

The difficulty of the investigation is hard to explain to those familiar only with the coke iron trade. I had taken some part in the development of the now accepted belief that soft steel, hard steel, white iron and

[1]From a paper presented at the Cleveland meeting of the American Institute of Mining Engineers.

foundry iron were members of a single series of iron-carbon alloys of increasing carbon contents, that silicon controlled the condition of the carbon, and that the analysis of pig iron for the ordinary elements of silicon, sulphur, phosphorus and manganese, gave the final word as to its character. The logical deduction from this theory was that, given the analysis, the character of the iron was established and virtually no attention need be paid to the fuel used in its production or any other consideration affecting its origin. It is common knowledge that the only essential difference in the conditions when manufacturing iron with charcoal instead of coke, consists in the fact that charcoal is so free from sulphur that much less calcarious, and therefore more fusible slags can be used without danger of introducing sulphur into the iron. Any coke furnaceman, convinced of the close correspondence between analysis and character, may well find it impossible to believe that such difference can exist, not only in strength but in appearance and structure between irons of similar analysis as we actually find in daily practice. That such can exist outside the knowledge of coke furnacemen is explained by the fact that we could run charcoal furnaces with slags similar to theirs and obtain products approximately similar to theirs in all respects, but by lowering the lime content of the slag we can bring into effect a vast series of varying conditions, which are masked, if not altogether obliterated by basic slags and the high temperatures necessary to fuse them. These conditions are impossible for coke iron because the resultant rise in its sulphur contents would ruin it.

When the selling prices of the Lake Superior irons were compared with the southern and eastern irons, the natural and obvious thing to do was to claim ignorance and prejudice on the part of the foundryman and poor salesmanship on the part of the agents, because anyone could compare the analyses of our iron with the others and see that ours were better. Gradually, however, we were brought into contact with foundrymen who convinced us by physical facts that the difference in price corresponded to a difference in quality and in ignorance, but that we were the possessors of the surplus amount of ignorance. Experience with these Lake Superior charcoal irons led to the adoption of the grading card, shown in Table I, which shows that there is an assigned depth of chill for each analysis. To gage the chilling qualities of an iron it is the custom to have a heavy block of cast iron, planed on one side, which forms a portion of one side of the pig mold for one pig in every third bed. The chill on this chill block is the one referred to in Table I. The grading card was based on the three principal lines of consumption of these irons, as follows:

First.—Straight foundry work, especially that of the better class, where strength and density of grain were required, but not chilling qualities.

Second.—The production of chilled castings, principally car wheels and chilled rolls, where manganese was supposed to be beneficial.

Third.—The production of malleable cast iron, in which manganese is generally specified low.

It will be noticed that the silicon limits from one grade to another are very narrow and that the grades run much higher than No. 1. Probably one reason for this is because the small quantity of sulphur present does not neutralize much of the effect of the silicon, so that the latter reaches the limit of its effect much earlier than in irons with higher sulphur. Consequently, No. 1 soft charcoal, with 2 per cent silicon, corresponds in some of its qualities to No. 1 soft coke iron, with 3.25 per cent silicon. For the foundry trade silicon is needed for scrap-carrying purposes, and as with coke irons, and irons with more silicon than No. 1 soft, are graded as Scotch irons. The practice was early established of taking a sample for silicon analysis from every third bed and grading the iron by the results of these silicon determinations. Two manganese determinations were also made on each cast. This grading card was established several years ago, and while it has been amplified recently, the silicon limits are practically unchanged.

Table I.

CHARCOAL IRON GRADING CARD.

Grade.	Silicon, average, per cent and over.	Chill against plate.	Manganese, car wheel grade, per cent or over.	Manganese, malleable grade, less than, per cent.
AA Scotch	3.00			
A Scotch	2.75			
B Scotch	2.50			
C Scotch	2.25			
No. 1 Soft	2.00		0.70	0.70
No. 1 Special	1.75		0.70	0.70
No. 1 Foundry	1.50		0.70	0.70
No. 2 Low	1.25		0.70	0.70
No. 2 High	1.00	No chill	0.70	0.70
No. 3 Low	0.80	Feather	0.60	0.60
No. 3 Medium	0.65	⅛ to ¾-inch	0.55	0.55
No. 3 High	0.55	⅜ to ¾-inch	0.50	0.50
No. 4 Low	0.45	¾ to 1¼-inch	0.45	0.45
No. 4 High	0.35	1¼ to 2-inch	0.40	0.40
No. 5 Low	0.30	Near white	0.35	0.35
No. 5 High	0.20	White, spot of graphite	0.30	0.30
No. 6 White	0.10	Clear white		

An early difficulty was to find out what is good iron and what is bad iron. Is a strong iron necessarily a good iron, or a weak iron necessarily a bad one? It took 1½ years to get a definite answer to this question. It was finally answered by the superintendent of the car wheel foundry of a large railroad system, who produced wheels that stood an average of 95,000 miles in service, as against an average of from 30,000 to 45,000 miles for the wheels of the ordinary commercial wheel foundries. He assured us that for his purpose, a good iron is a strong one and a strong one a good one. The standard of strength with him was a 2-inch square bar, broken transversely on centers 12 inches apart. If the strength for a given grade was up to certain limits and the chill of a certain depth, the iron was good. If not, the iron was unsuitable for his purpose and was rejected.

After this, we commenced to take pyrometric observations of the temperature of the running iron and cinder, and bought a small transverse testing machine, capable of breaking a 1¼-inch round bar on 12-inch centers. We cast four bars on end in green sand molds, with iron dipped directly from the runner, at each cast, and broke these on the testing machine. To record the test-strain diagrams of the test bars, we later used an autographic machine which soon indicated that the quality of the iron was to have a decided bearing on the character of the curves produced.

One well-established tradition in the business at that time was that iron with a white, chilled spot in the center of the pig was weak and utterly

worthless for the manufacture of car wheels, or for any other purpose requiring a strong, tough chill. This is commonly known as spotted iron. A second tradition was that an iron made under certain conditions in which the grain was exceedingly close, verging into a chill of greater intensity than the silicon contents of the iron would explain, was a very strong, tough iron, particularly suited for cylinder castings. It was consequently called *special cylinder iron.* This iron is produced with unusual furnace conditions and may have any silicon contents from 0.5 to 2 per cent.

The investigation proved, first that the special cylinder iron was far stronger than normal and that the spotted iron was far weaker, thus confirming the traditions. Although samples of southern and eastern irons were procured, in order to determine their strength, also chemical analyses for comparison, it gradually developed that a microscopic and polishing apparatus was necessary, and this was secured. We subsequently became convinced that carbon determinations were a necessity. The analyses made after this consisted of total and graphitic carbon on every cast, in addition to the six silicon and two manganese determinations on each cast. Later sulphur and phosphorus determinations were added and with these it was shown that instead of containing 0.01 per cent sulphur, good charcoal iron generally contains from 0.015 to 0.02 per cent, even when made from the best of ores. A crucible furnace was installed to determine the effect of remelting our own iron. These remelts were finally made on every cast of iron suitable for chilling purposes, that is, everything below the No. 1 grades, on both 1 and 2-inch square test bars.

Method of Grading Iron in Pig Yard

In order to utilize this information, the iron is piled by grades, but the portion of a given pile which comes from a given cast is bulkheaded off from the portions on either side of it and marked with a tag, giving the date and hour of the cast and the silicon and manganese of that portion of the pile. The daily furnace reports carry the ordinary information contained in a daily report, and in addition, the carbon determinations, at least one slag analysis, the temperature of the running iron and cinder, the breaking strength of 1¼-inch round bars poured from the cast, and the breaking strength of the remelt bars on the chilling grades of iron. In this way we know the exact iron that goes out on each order, and when we get an order for exactly the same kind of iron, we can take our records and locate it with little or no difficulty. By this system we are able to direct the various grades and kinds of iron to the fields of consumption to which they are best adapted.

We finally decided that the spotted iron, the normal iron and the special cylinder iron were the members of a continuous series of increasing quality and that if we could find out the cause of the spotted iron and the proper method of prevention, we would have at least part of the problem solved. We do not feel that we have yet reached the complete solution of these problems in such a degree as would make their publication safe and desirable, but we think we have succeeded in finding the cause of the spotted iron and in connecting up its analysis and physical qualities and assigning to it its proper place on the iron-carbon diagram.

Cause of Internal Chill

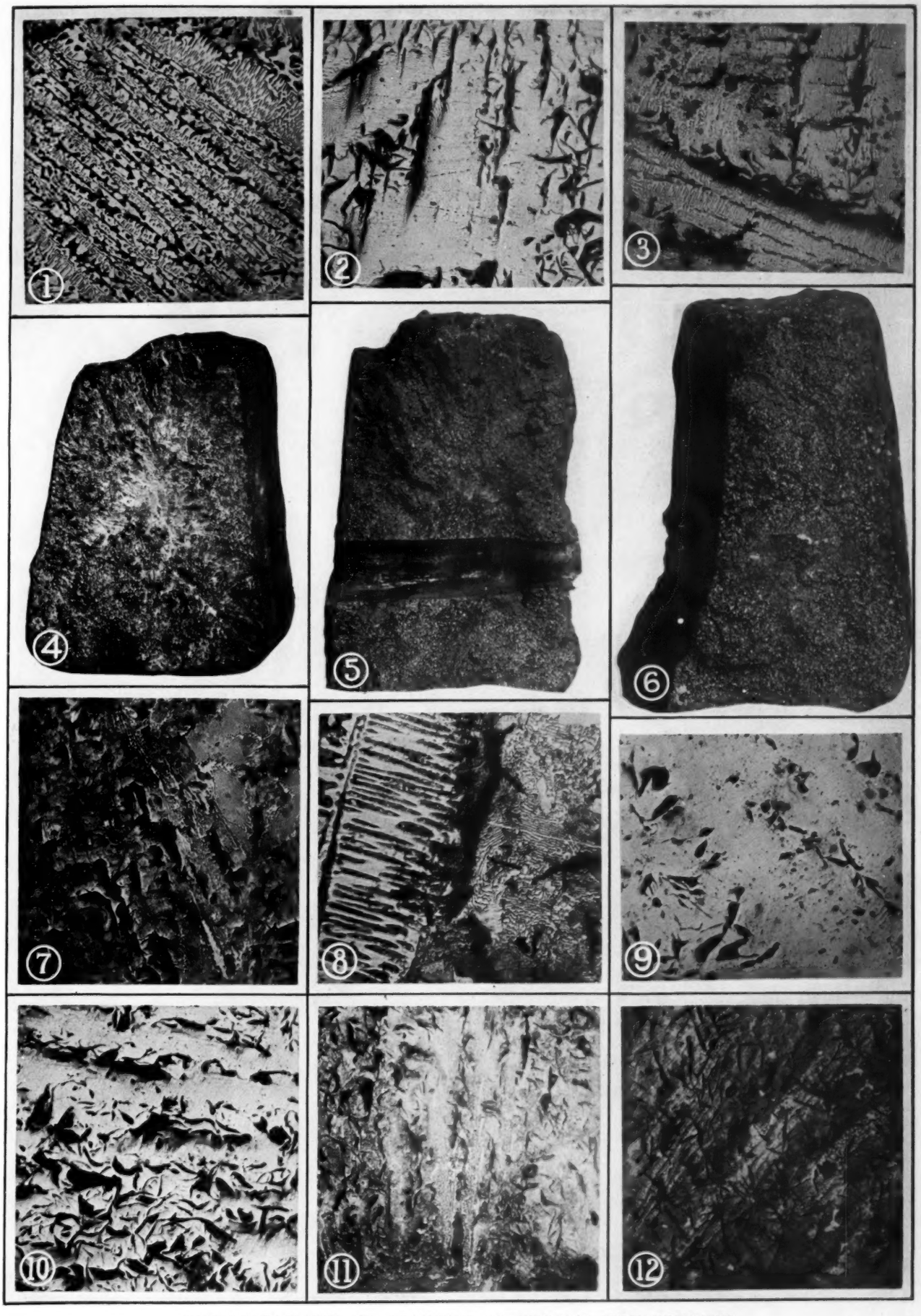
Fig. 4 shows a representative piece of spotted iron, in which can be seen the white spot in the center with two branches extending toward the upper corners of the pig. Analysis of the gray portion and the white spot showed that the total carbon was about one-half per cent higher in the former than in the latter, but no material variation in the other elements would account for the internal chill. The ordinary explanation given by experts that this phenomenon was caused by the fact that the center of the pig was still liquid when the exterior had solidified, and that the expansion accompanying the evolution of the graphite could not take place on account of the contraction of the solid envelope on the liquid interior, was not satisfactory, because all grades of iron cool under these conditions and only a small percentage of it is spotted.

It was found that certain irons that had this tendency to spot showed a decided degree of lamination where they were chilled. In the corners of some pigs could be seen alternate layers, perfectly white and solid gray, the white leaves being no thicker than ordinary writing paper, with the gray leaves perhaps twice as thick. It was obvious that such irons must break along the faces of such white leaves, and that the term high cleavage, long used in the Lake Superior region, expressed the quality accurately. The irons with a tendency to spot showed a chill much lower than their analysis would warrant, and we began the practice of marking such iron with a distinctive mark and forbidding its shipment to manufacturers of chilled car wheels, or any similar article, because the testing machine confirmed the ocular judgment that these irons were very weak. Figs. 1, 14 and 16 are microphotographs of the spotted portions shown in Fig. 4. The masses of detached plates are not interlaced, resulting in a low intensity of stress, which will cause cleavage along the faces. The structure was finally recognized as that of eutectic cast iron of 4.30 per cent carbon. It became evident that this was a segregation product, and that the white chilled spot was the eutectic of 4.30 per cent carbon, which had gone to the same relative position in the pig as that in which we find the segregated portion of a steel ingot and for the same reason: That both had remained molten on account of their low freezing temperature after all the other portions of the mass were solidified. From this point the investigation naturally divides itself into two parts: First, what are the causes of this action, and second, how far does the action extend and how serious are its effects in industrial work?

The first investigations of the carbon contents in various portions of the face of the pig were made on the iron shown in Fig. 5. These carbon determinations varied from 4.30 to 4.82 per cent total carbon, with the carbon in the gray portions much higher than that in the spot. The iron shown in Fig. 4 was analyzed for carbon at eight points, in which the total carbon varied from 4.05 to 4.28 per cent. The spot contained the highest carbon except the gray portion immediately above it, which is only slightly higher. The first cooled portions of the pig, however, are all lower in carbon than the spot. In these portions solidification has evidently taken place, first, as austenite with a lower carbon content and with a correspondingly higher freezing point than the eutectic.

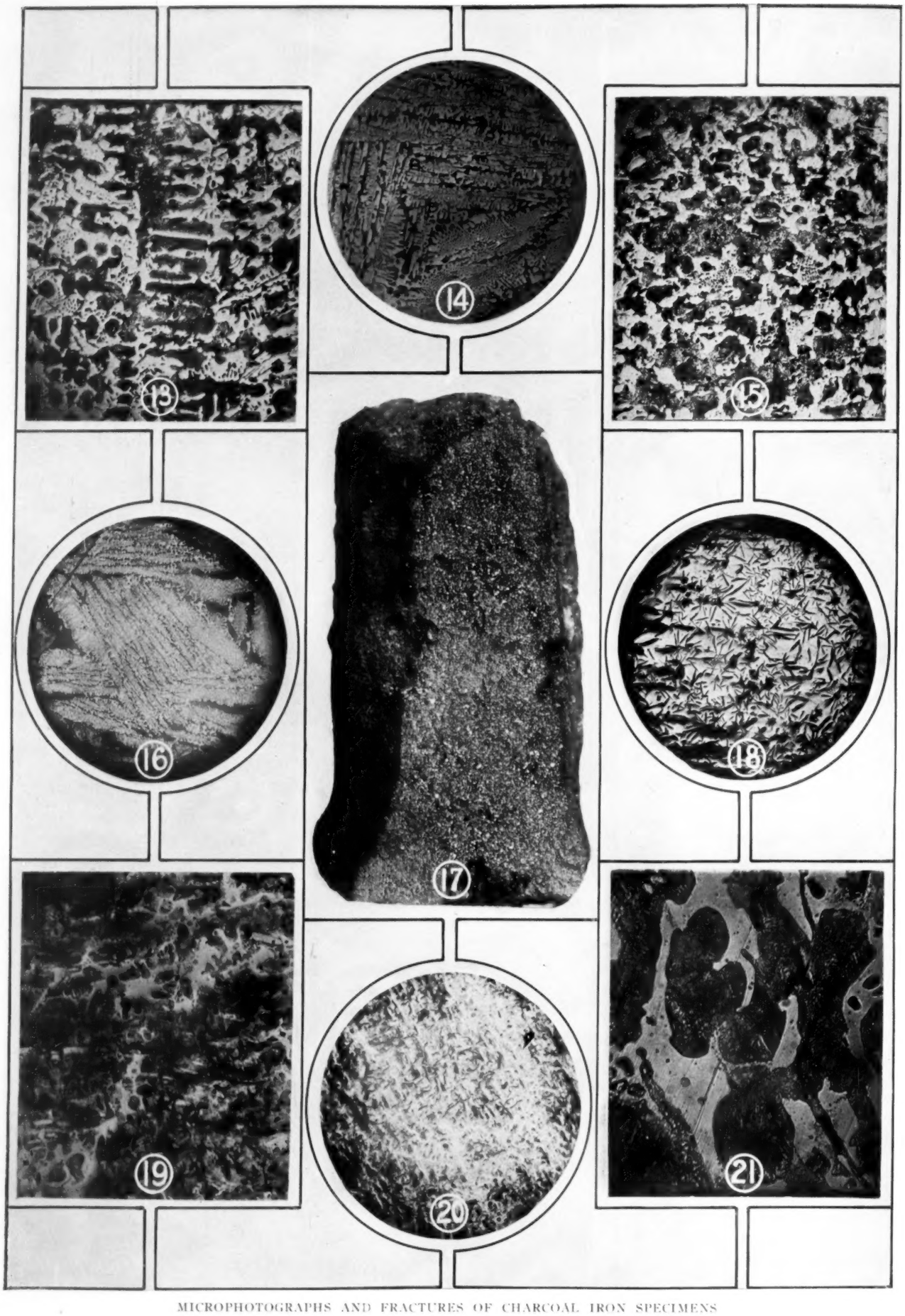
Cleavage Conditions

If our theory is correct, the cleavage condition, visible to the eye, must be more extensive in a hypereutectic spotted iron than in a hypoeutectic one, and it must extend to the very exterior of the pig in the former and be more and more restricted to the center as the carbon is lower in the latter. These conditions we find in fact to exist. The cleavage condition is usually manifested particularly in the upper cor-



MICROPHOTOGRAPHS AND FRACTURES OF CHARCOAL IRON SPECIMENS

Insert, THE IRON TRADE REVIEW, *Nov.* 21, 1912



MICROPHOTOGRAPHS AND FRACTURES OF CHARCOAL IRON SPECIMENS

ners of the pig. In Figs. 2 and 3 are shown a specimen from one of the corners of the pig shown in Fig. 5. The specimen was polished and photographed without etching, to show the lamination and orientation of the graphite. The same sample, etched and at the same magnification, is shown in Fig. 7, and under higher magnification in Fig. 8. In order to show whether a contrast existed, a similar corner of the pig, shown in Fig. 4, was prepared in the same way, and this is illustrated, unetched, in Fig. 9. The lamination is much less, also the graphite is much less orientated in this specimen. This being a hypo-eutectic iron, the austenite froze first.

The irons that have a tendency to spot without actually spotting usually occur in the No. 3 grades. We have also noticed irons in the No. 2 and even softer grades, with a close spot in the center, surrounded by more open-grained material. Those with this fracture were likely to be below the normal strength for their grade, and by examining the upper corner of the pig, it was possible in some cases to detect slight traces of cleavage. A specimen was prepared from the upper corner of a high No. 3 pig, and photographed without etching. The original pig is shown in Fig. 6 and the microphotograph of the specimen in Fig. 10. This was a hyper - eutectic iron, as shown by the following analysis: Silicon, 0.45 per cent; manganese, 0.38 per cent; phosphorus, 0.124 per cent; sulphur, 19 per cent, and total carbon, 4.46 per cent. The same structure, etched, is shown in Fig. 11. The plates of eutectic shown in Figs. 10 and 11 are more broken up than the similar areas in Figs. 14 and 16. This is probably the result of the greater silicon content of the pig shown in Fig. 6 than in Fig. 4, and is reflected in the solid gray fracture of the latter as compared with the partially white fracture of the former. The effect of silicon is obviously to break up these plates of eutectic into pearlite and cementite, and then in some cases to break the latter up into pearlite and graphite. If this is so, there should be an orientation of the graphite even in irons so high in silicon as to have left scarcely any trace of the original eutectic. To prove or disprove this, a specimen was prepared from the upper corner of a pig of low No. 2, shown in Fig. 17, in the corners of which faint indications of cleavage were found. This specimen, in an unetched condition, is shown with low magnification in Fig. 19. The orientation of the graphite from the upper left to the lower right hand corner is visible. The same specimen etched is shown under higher magnification in Fig. 12. The white dots represent all that is left of the cementite, which once formed part of the eutectic plates. The analysis of this pig gave total carbon ranging from 4.03 to 4.27 per cent. It seems reasonable to believe that this was a hyper-eutectic iron in which the silicon had forced down the eutectic point to about 4 per cent instead of 4.30.

Control of Carbon Contents

During these investigations, R. W. Durrett, manager of the Newberry plant of the company, determined some of the conditions controlling the carbon contents of pig iron and produced irons of very low carbon, in some cases as low as 3.3 per cent. The closest examination of the iron failed to show any traces of cleavage, and there was not the slightest indication of spotting. Specimens were prepared and the reproductions under different magnifications are shown in Figs. 19, 20 and 21. The irregular polygons of primaustenoid are plainly visible, but there is not the slightest sign of any residual of the eutectic.

The reason why irons with a tendency to spot are deficient in chilling qualities is a point which we have not yet worked out. We have established beyond the possibility of a doubt that it is not dependent solely on the carbon in iron. It is entirely possible that part of the cause may be the temperature at which the iron is cast.

Conclusions

The following conclusions have been drawn:

Spotted irons are products of carbon segregation which may take place in irons containing either more or less carbon than the eutectic ratio.

The segregation is less marked and less likely to have ill effects the further the carbon is below the eutectic ratio.

When the fracture of an iron shows high cleavage at the edge, it is almost sure to be up to, or above, the eutectic ratio, and is almost certain to be a weak iron.

Close spots not associated with cleavage, may occur in irons of good quality, especially where the silicon is comparatively high.

While we have discovered the cause of spotted irons of high cleavage, and the reason for their corresponding weakness, it is our firm conviction that there is something else that makes for strength, and for high chill with a given silicon content, in just the same way that high carbon is here shown to make for weakness and low chill with a given silicon content. What this unknown condition may be, we do not yet know, although we have some unconfirmed opinions upon the subject. But there are many things which make us believe that with this other condition properly fulfilled, a relatively high carbon iron may be stronger and better than an iron of much lower carbon, with this condition absent. We are continuing the investigation to determine what the remaining unknown condition may be. We think we have proved that high carbon by itself makes an iron weak and poor, but low or moderate carbon by itself is not enough. It is our hope that we shall eventually discover what causes good iron to be good, as well as what causes poor iron to be poor, and we have confidence that we shall eventually succeed in producing the grades and qualities we desire, approximately at will.

Book Review

The Elements of Drawing; by George F. Blessing and Lewis A. Darling; 177, 6 x 9-inch pages; illustrated; published by John Wiley & Sons, New York City, and furnished by THE IRON TRADE REVIEW for $1.50 net.

This book presents a course of instruction in mechanical drawing for beginners who intend to pursue a course in engineering or who desire to prepare themselves to do commercial drafting. While the work is based on the practice of Sibley College, Cornell University, it is written in a flexible manner so as to be adaptable to most logical sequence of presentation, the general text applying equally to the drawing board course presented or to a beginner's course arranged by instructors on the subject. The authors state that there is nothing experimental in the principles or methods outlined, as most of them have been in constant use in Sibley College for years and have been productive of excellent results, not only in teaching the art of mechanical drawing, but as a preparation for the more advanced work in design.

The Manitowoc Dry Dock Co., Manitowoc, Wis., is building a 600-foot steel dry dock, which will permit the company to handle work on the largest lake freighters.

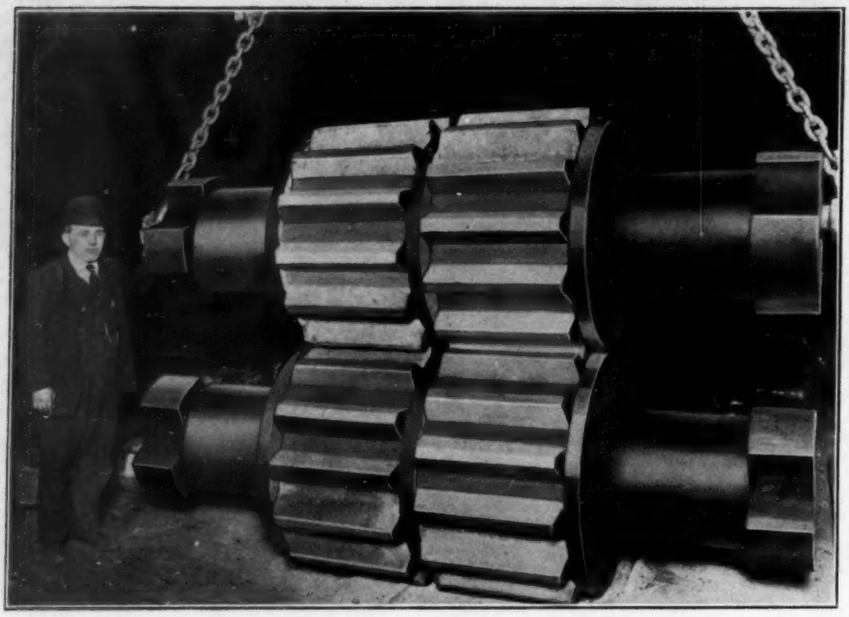


FIG. 1—MANGANESE STEEL BLOOMING MILL PINIONS CAST SOLID WITH NECKS AND WOBBLERS

Manganese Steel Mill Pinions

No single piece of rolling mill machinery is subject to more severe usage than the pinions which connect the rolls with the source of power. Steel mill engineers have given a great deal of thought to the design of mill pinions and although great advances have been made in the past few years, breakages are even now not infrequent occurrences. Such breakages are disastrous, especially in a rush season like the present, because they seriously interfere with the production. In many plants the engineers have sought to minimize the breakage problem by mounting the pinions in removable housings and providing extra sets which can be dropped into place by the crane with little delay should the pinions in service fail.

It is better, however, to attack the problem directly and improve the strength of the pinions themselves. Working along this line, the Edgar Allen American Manganese Steel Co., Chicago, has developed a line of heat-treated manganese steel pinions. Since it is not practical to heat-treat steel to a thickness of more than 5 inches, the manganese pinions are cored out to this thickness. They are, therefore, much lighter than the ordinary pinion.

These pinions have been made in very large sizes and are cast solid with the necks and wobblers as indicated in Fig. 1 and also made in the form of shells, which are keyed to forged steel shafts as indicated in Fig. 3.

A set of very large pinions similar to those illustrated in Fig. 1 are now being made for an eastern steel works. These pinions are 54-inch pitch diameter and weigh 24,000 pounds each. The teeth have a 4-foot, 10-inch face and are fully shrouded. The necks are 23½ inches in diameter, the neck core being 12½ inches in diameter and the gear core 3 feet. The pinions will have 16, 22½-degree involute teeth, 10.21 inches circular pitch. If these pinions were made of solid metal they would weigh about 42,000 pounds instead of 24,000 pounds.

FIG. 3—A PAIR OF LARGE MANGANESE STEEL SHELL PINIONS

FIG. 2—GRINDING MANGANESE STEEL PINIONS

Another set of large pinions, 42 inches pitch diameter, has been in service for some months in a western mill and are said to show no signs of wear; these pinions have 12 teeth, 11.333 inches circular pitch and weigh 18,000 pounds finished. The rough casting with the gates and risers attached weighs 24,000 pounds. The face of the tooth is 4 feet in width and the shrouds are 3 inches in thickness.

The pinions are made with a special alloy steel high in manganese. The metal is blown in a Bessemer converter, the ferro-alloys being added just before the steel is poured into the molds. Great care is necessary,

however, to remove the slag and other impurities.

The pinions are molded vertically in a four-part flask provided with goose-neck gates so that the metal enters from the bottom. The molds are oven dried. The central core is necessarily heavily rodded, but is so arranged that it may be removed through holes in the ends of the casting.

The casting is annealed and heat-treated after it is cleaned and when this process is complete, the casting is so hard and tough that it cannot be machined by ordinary methods. The surplus metal must, therefore, be removed by grinding, and the Edgar Allen American Manganese Steel Co. has developed a number of special machines of large capacity for this purpose. One of these machines is shown in Fig. 2, at work on a heavy mill pinion. As indicated in the illustration, the machine is simply a lathe with the cutting tool replaced by an adjustable, motor-driven grinding wheel. For grinding the teeth of small and medium sized gears a special machine has been designed, which cuts the teeth to a theoretically perfect shape.

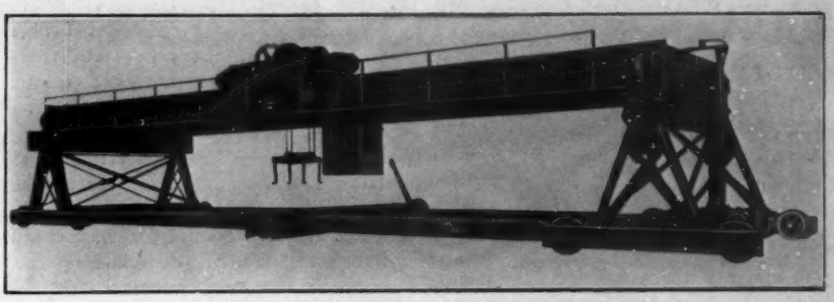


FIG. 2—TRANSFER CRANE DESIGNED TO CARRY A TRAVELING CRANE OF 50-FOOT SPAN

Transfer Cranes for Shop Service

In hoisting and transporting materials in a manufacturing or industrial plant, the standard type of electric traveling crane meets with certain limitations in that it is unable to transport material to any part of the plant except the space bounded by its own runways. The electric traveling mono-rail hoist, on account of its great flexibility, being able to travel around curves and through switches, thereby passing through all the various buildings and outside storage yards of a manufacturing plant, possesses advantages for industrial transportation beyond the limits of the plain traveling crane. However, the mono-rail hoist when traveling on its fixed beam or rail also has its own peculiar limitation of territory, this being confined to the narrow space the runways pass over. Both of these limitations are obviated by the employment of a transfer crane, Fig. 1, which is a combination of an electric hoist and the electric traveling bridge with a suspended telpher beam. The advantages attained by the great flexibility of this combination have solved many crane problems.

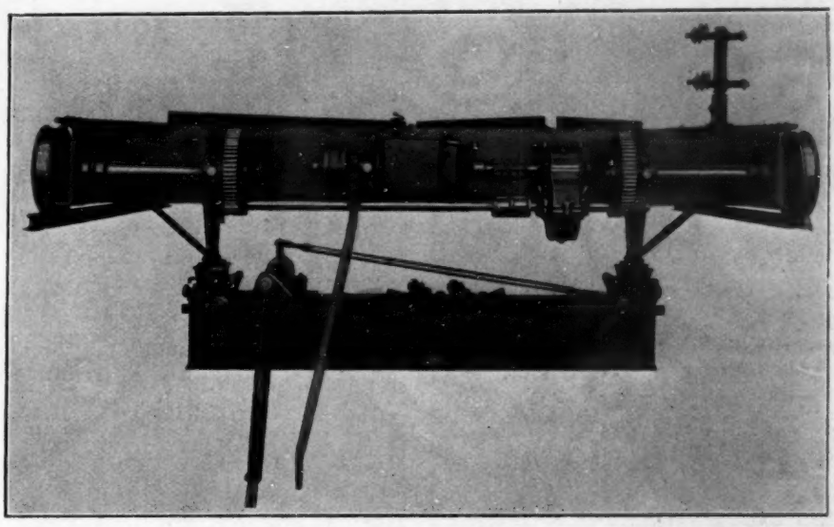


FIG. 1—CRANE FOR TRANSFERRING TRAVELING I-BEAM HOISTS

As designed by the Pawling & Harnischfeger Co., Milwaukee, the transfer bridge is similar to the regular crane bridge except that an I-beam, upon the lower flange of which the electric traveling hoist operates, is rigidly suspended from the crane girders. At desirable points along the crane runway are spur tracks which match exactly in size and elevation with the telpher beam on the crane; these may be either on one or both sides of the crane runway. A locking device is provided on the crane for the purpose of engaging with the spur tracks. This device automatically operates safety stops on the crane beam and the spur track which prevent the hoist from run-

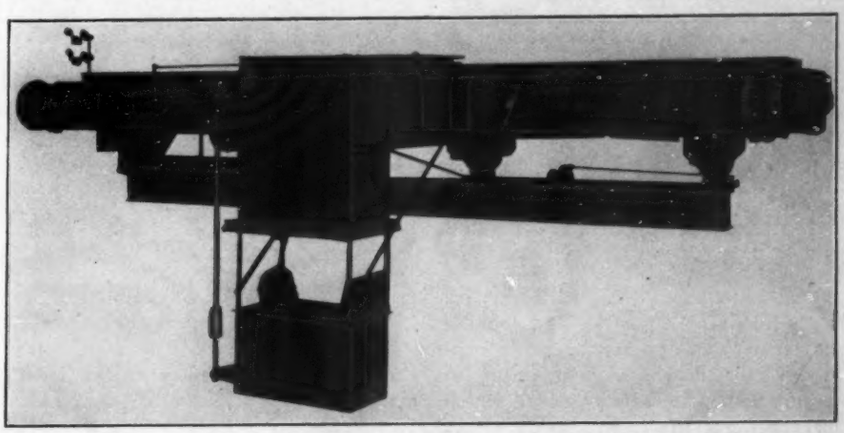


FIG. 3—CRANE FOR TRANSFERRING HOISTS, EQUIPPED WITH INDEPENDENT OPERATING CAB

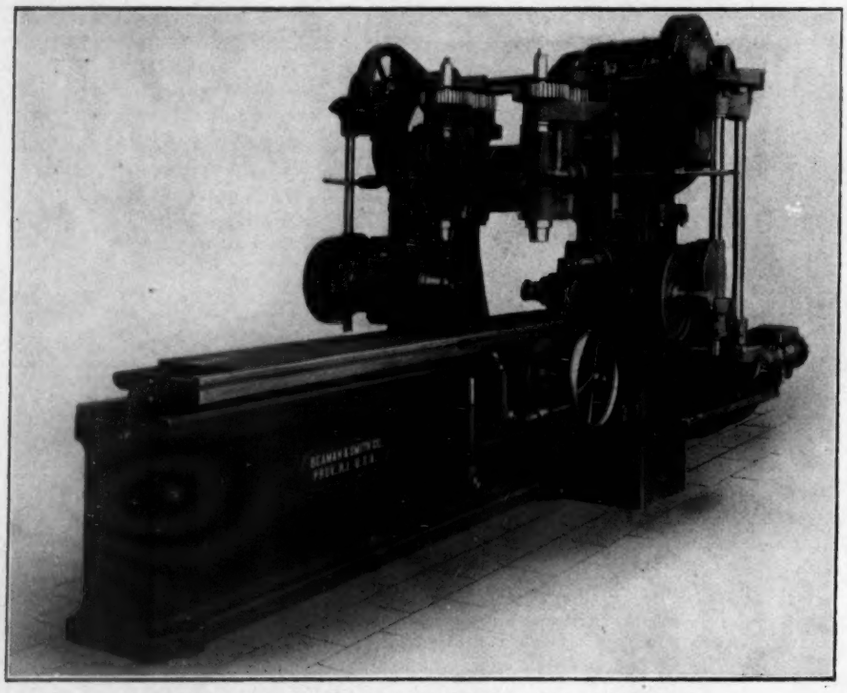
The H. J. Heinz Co., Pittsburgh, is said to have found that vanadium cast iron bottle molds machine better than the ordinary iron, take a higher polish, stand the action of the hot blast better, do not require as much cleaning and do not crack from the heat as readily as the ordinary mold. These molds will give from 20 to 25 weeks service before it becomes necessary to bush them, and for the latter purpose the company uses a vanadium cast iron bushing, which is said to give as good results as the steel bushing.

ning off the transfer except when the crane is in the proper position.

The bridge motor is usually operated from a controller placed in the cage of the hoist, except in the case where one bridge is used in connection with more than one hoist, when the bridge is usually provided with a separate operator.

Transfer bridges are also used for the purpose of transferring traveling cranes from one runway to another parallel runway. This arrangement is particularly advantageous in lumber or pipe storage yards where one electric traveling crane can be made to serve several runways.

The crane transfer bridge, Fig. 2, usually consists of a lower structural frame provided with trucks geared to a traversing motor. The bridge runs on a track at right angles to the regular crane runways to be served. It may be designed to run either on surface tracks, or on a track elevated but at some distance below the crane runway rails. Mounted on the lower structural frame are short girders carrying two rails exactly matching the crane runway rails as to elevation and span; these rails are of sufficient length to allow the traveling crane to run onto them. A locking device is provided for engaging and locking the transfer bridge to the crane runway. This device also operates in conjunction with safety stops, which prevent the crane from leaving either the crane runway or the transfer bridge except when the two are locked together. The transfer bridge is operated from the cab of the traveling crane, using the crane bridge controller; this is accomplished by the use of a double-throw switch located in the cage. The electrical connection is made automatically as the crane runs onto the transfer bridge. The locking levers being placed within convenient reach of the crane operator's cage, it only requires a few moments to transfer a crane from one runway to another, either with or without load and this is accomplished by the operator without leaving his cage. This type of apparatus prevents the bunching of several cranes permanently on one runway when the service occasionally calls for such distribution.



A NEW MILLING MACHINE WITH FOUR SPINDLES

Four-Spindle Milling Machine

The accompanying illustration shows a four-spindle milling machine built by the Beaman & Smith Co., Providence, R. I. The bed which supports the work table has two uprights attached to it, which carry a cross-rail. There are four spindles, two vertical, which have a horizontal movement on the cross-rail, and two horizontal, which have a vertical movement on the uprights. The surface of the table is 17 inches wide and 10 feet long, with a movement of 10 feet, 9 inches on the bed, and contains three T-slots, finished from the solid, also two rows of holes for stop pins. The table is provided with a quick power movement of 10 feet per minute in either direction, and has an automatic stop and feeds arranged to maintain the desired rate at any spindle speed. The table is operated by a screw in a revolving bronze nut, the thrust being taken by ball bearings.

The feeds are positive, through gearing contained in a feed box, conveniently placed, and the change from one rate to another is obtained quickly. There are nine of these changes, ranging from 1 inch to 12.3 inches per minute at a driving shaft speed of 500 revolutions per minute. The crucible steel spindles run in hard bronze boxes and have a 6-inch independent adjustment. The ends are tapered and are 3¼ inches in diameter for face milling cutters. Each spindle has a hole through its center for a retaining bolt. The front bearings are 3⅞ inches in diameter and 5 inches long, and compensation for wear is provided; the rear bearings are 2¾ inches in diameter and 4¾ inches long. The four spindles are driven in unison. The gearing for the vertical spindles in the ratio of 7¾:1 gives a speed of 66 revolutions per minute, and for the horizontal spindles a ratio of 21¾:1 gives a speed of 23 revolutions per minute.

The machine is driven by a variable speed, 10-horsepower motor, geared to the driving shaft in a ratio of 3:1. The speed of the motor varies from 500 to 1,500 revolutions per minute. The machine can also be constructed to be driven by a 5-inch belt on a three-section cone, from 11½ to 16 inches in diameter, and when belt-driven, the countershaft has tight and loose pulleys, 14 inches in diameter for a 5-inch belt, to run 360 revolutions per minute.

The distance between the uprights is 30 inches. The least distance between the ends of the vertical spindles and the top of the table is 9 inches and the greatest 15; the minimum between centers is 10⅝ and the maximum 30 inches. The distance from the center of the horizontal spindles to the top of the table varies from 4 to 10 inches, and between ends from 6 to 18 inches. The total weight of the machine is approximately 20,000 pounds.

The firm name of the Industrial Car Co., West Park, Cleveland, has been changed to the Electric Locomotive & Car Co. to emphasize the electrical branch of this company's business. J. P. Copland, general manager, is in charge of this line of work. The company builds locomotives and all types of industrial cars.

The Solid Non-Metallic Impurities in Steel[1]

A Discussion of the Causes of Oxidation Products in Steel Which are Termed Sonims and How They May Be Eliminated

By Henry D Hibbard

Various names, such as oxidation products, occluded slag, entrained slag, mechanically-held impurities, entrained silicates, and others, have been used by different writers to designate the subject of this paper. To get the advantage of a short distinctive name for them, the writer has proposed the term sonim. A sonim may be defined as a solid, non-metallic portion of matter existing as an impurity in metal. A piece of brick, clay or sand imbedded in metal would be considered as a foreign body and, therefore, not a sonim. Gases are not included within the scope of the definition.

Occurrence and Composition

Sonims occur disseminated throughout the steel as cast, in all forms from the molecule up to the visible globules into which they collect in the process of elimination. In steels made by the oxidation processes—pneumatic and open-hearth—sonims may be very important, as they are nearly always contained more or less plentifully in such steels.

The treatment of the sonims is a metallurgical problem. An ultimate analysis of the steel, accurate and complete as usually understood, might give no clue to their presence or absence. The eye, aided, perhaps, by magnifying means, detects sonims when they are in the form of globules, but even the microscope fails to show them when they approach molecules in size, though then their effect is greatest.

Sonims are chiefly oxides and silicates, with some sulphides, either introduced in the charge or resulting from the methods of manufacture. The oxides are those of iron, silicon, manganese and perhaps of other elements that have been added. The silicates are usually sub-silicates, having three or four molecules of base to one of silica, the bases being chiefly oxides of iron and manganese. Probably phosphide, silicide and sulphide of iron are metallic impurities which dissolve in the metal and are outside our subject. They act somewhat like carbide of iron when present in small quantities, raising the tensile strength.

What the chemist reports as silicon in steel may have existed there in silicide of iron, which in well-made steel, made by the solution method, does good by favoring solidity; or it may have been in the form of silica either alone or as a silicate. The presence of 0.01 per cent of silicon may mean about 0.02 per cent of silica, or 0.01 per cent of a sub-silicate of iron or manganese. This silicate, having a specific gravity about half that of iron, will represent sonims of 0.2 per cent of the volume of the steel. This amount or even less when existing in certain ways considered later, may account for almost any degree of poor quality in the steel. Of course, sonims are directly due to the oxygen or oxide of iron absorbed by the metal in the process of manufacture, but they are developed in large part by the means employed to remove such oxygen. That is, when metallic manganese is added to oxidized iron containing the very harmful oxide of iron and silicon, another impurity, oxide of manganese, is produced which has an affinity for the other two and all three unite in due course in a fusible silicate.

Sonims Are Normal Constituents

Any metal electro-positive to iron at steel-making temperature, such as calcium or manganese, which may be added to the steel will probably be represented in the sonims by its oxide, silicate or sulphide, whether added for purifying or for giving certain properties to the finished steel. Any electro-negative metal added, such as nickel and copper, will be practically all retained in metallic form in the steel. The number of possible mixtures or combinations of these sonim-ingredients is very large. Sonims may be considered as normal constituents, consisting of impurities separating from the steel on their way to join the slag.

When soft steel of a commercial quality, made by what I have elsewhere styled the evolution method, in which the gases are encouraged to evolve freely during solidification, is in the molds, there is a very active escape of myriads of small gas bubbles, which, in rising, stir the metal very thoroughly, until it freezes or becomes pasty. During this evolution of gas a non-metallic slag-like scum, more fusible than the metal, collects on the top of the ingot. In the acid open-hearth process it is sometimes olive-green or gray, though it may be black; and it is sometimes crystalline, though usually vitreous. On basic ingots it is black and crystalline.

Are Found in Rail Ingots

Rail steel ingots examined within the past year or two at Watertown Arsenal, showed numerous sonim globules within 1 inch of the bottom of the ingot, and far fewer, perhaps not over a fifth as many, 6 inches from the bottom, where the steel had remained liquid about 15 minutes longer. It was Bessemer steel made by a quasi-solution method, the ingots showing many blowholes; but there must have been little or no agitation after the steel had become quiet in the molds, and the relative freedom of the metal from sonims 6 inches from the bottom surface must have been due to the period during which the metal was still liquid, and the sonim globules were floating upward, to collect in or about the pipe and central segregation, adding to the injury from these defects. These globules must have largely been formed in the steel before it was run into the mold, and the whole mass must have contained sonim globules as plentifully as the metal in the outer skin of the ingots. The sonim globules, while very numerous, were not absolutely ruinous to the steel and their effect in the interior away from the skin, where their quantity was greatly reduced, might be considered almost negligible, except in the upper central part of the ingot where they collected. By hot working the sonim globules are of course drawn out with the metal into streaks and threads.

The effects of sonims may vary in all degrees. They may be rank poisons, such that the thousandth part

[1]Presented at the International Congress for Testing Materials.

of the damage they work would render the steel unfit for any purpose whatever for which steel is required; or they may be comparatively harmless. Their effect is practically never proportioned to their quantity, but depends on the state in which they exist. Until much more is known about them, but little can be said quantitatively of their effect on the finished product. Their ill effects are manifested at both ordinary and hot-working temperatures, but more strikingly in the latter, in the red-shortness they cause. We cannot follow them back to their beginnings and, therefore, cannot say whether their first effects are produced in a physical or chemical way, but in their visible forms their effect is purely physical.

About 25 years ago I made in a Siemens furnace a heat of straight silicon steel, adding about 0.3 per cent of silicon and carbon at the end with no manganese. It was a 12-ton heat, the charge was pig and scrap, and no ore was added. The fuel was producer gas. The heat was normal until the addition of the ferro-silicon at the end, when the boiling ceased and the metal was cast into 12 x 12-inch ingots. It lay dead in the molds and solidified quietly, forming the usual pipe. When reheated and rolled it proved to be red-short to a most astonishing degree, being broken up by one pass through the blooming mill perhaps as completely as if it had been made wholly of slag, or of sonims. It seemed evident that the red-shortness of this steel was largely due to the reaction between the silicon added and the oxygen of the metal forming silica, which floated in the liquid steel as so much foreign matter very intimately intermixed, breaking everywhere the continuity of the metal, with the result that it could not be hot-worked in the slightest degree without rupture. Manganese works to remove silica as well as oxide of iron from an oxidized iron charge.

Effect of Silica and Oxide of Iron

The effect of a small amount of silica and oxide of iron was shown in this experiment to be extremely great. As the solidifying effect of the silicon added seemed to be about as great as if accompanied by the usual manganese, it seems fair to assume that a small fraction, probably less than a fifth of it, or say not over 0.06 per cent, was oxidized, and the resulting 0.12 per cent of silica with the small amount of oxide of iron left unreduced by the silicon was the cause of the excessive degree of red-shortness. Therefore, a proportion of these sonims so small as to be much less than would be detected by the usual analysis is apparently enough in certain forms to destroy the usefulness of the steel. Chemists do not usually report less than 0.005 per cent of silicon, but, judged from its effect in the experimental heat, the tenth part of that percentage in the form in which it existed would have made the steel ruinously red-short.

Effect of Ore Added to Bath

After having had some experience at melting steel by the pig and scrap method, in which no ore was added to the bath, I was obliged, at another place, to make steel by the excess-of-pig-and-scrap method, the excess of silicon and carbon being worked out with ore, a practice which requires methods quite different from those presented by the pig and scrap method proper. I was melting soft steel for boiler and ship plate, and the plates made were passing inspection with some success; but they showed a tendency to red-shortness, and some had snakes on the surface, while the elongation in the pulling test was usually close to the lower limit permissible when the plates were sold on specifications. The only thing unusual in the analysis was high silicon, ranging sometimes as high as 0.02 or 0.03 per cent.

Concluding, perhaps naturally, that the silicon was the cause of the trouble, I tried to eliminate it more completely from the metal of the next heats by oxidizing it with more plentiful additions of iron ore. To my surprise the chemist reported higher silicon than before; and the quality of the steel, as developed in rolling and testing, was worse instead of better. As usual in such cases, I questioned the accuracy of the analysis; but the chemist stood his ground, and events proved that he was right.

The next procedure was, of course, to go in the opposite direction; to use ore less freely and to allow time at the end for some of the iron oxide in the slag to be worked out by reduction and combination with silica of the acid hearth, the sonims in the metal being worked out at the same time. The oxides in the slag and metal followed similar courses as though there were some balance between them, those in the metal varying roughly with those in the slag.

The quality of the steel was improved by this procedure; and, on our going the same way to the reasonable limit, all signs of red-shortness and snakes disappeared, and the plates scaled cleanly and freely in rolling, which they had not done before, even when they were not pitted. The elongation in the pulling test increased also. It thus became clear that, so long as there was manganese remaining in the metal, it was continually being oxidized, and the resulting oxide united with the silica as it formed, making a fusible silicate which collected together and floated out, collecting other oxides as it went, cleaning the metal, and eventually joining the slag. But after the manganese was all gone the silica formed floated in the bath unfused and, therefore, without power to collect into particles large enough to float on the top. Hence, when the oxidizing conditions were intensified by larger additions of ore, the manganese was eliminated earlier than before, and the silica remained in larger quantity in the metal. In other words, the elimination of silica was seriously checked as soon as there was no manganese oxide to flux it within the mass of the metal; and it apparently remained suspended as so much foreign matter in the steel.

Another effect, possibly, of sonims, appeared about the same time in acid spring steel made by the melt-and-tap method in which as soon as the charge had the desired carbon and temperature it received its final manganese and was tapped. Customers complained that the springs took a permanent set too quickly, and the defect was remedied in subsequent heats by adding more pig iron to increase the carbon content a little and then holding the charge after melting and allowing it to boil and work out, which would slowly remove carbon and sonims too, unless the slag was unduly charged with oxide of iron.

Sonims in Ordinary Steels

In relatively large globules, the effect of sonims, unless their number be abnormally large, is not very important in the commoner grades of steel. An exception to the latter statement is sometimes presented when an extraordinary large globule or group of globules has formed, which, for some reason has not floated out of the metal, and which may, when extended by forging or rolling, form a weak spot or surface in the resulting article, which is a flaw, and may lead to rupture in service. Apart from such exceptional globules, which may reach 1/16 inch in diameter, sonim globules are rarely more than 0.01 inch in diameter, and may exist

in any size from that down to single molecules, of which millions are required to make a globule 0.01 inch thick.

Discrepancies are continually found between the physical properties of steels of substantially identical composition, made by the same process, the same plant and the same men, and commercially of good quality. Differences occur in the properties of steels due to the different processes by which they are made, and abnormal heats are met with, having properties which do not nearly coincide with what would be expected from their analyses.

We are accustomed to ascribe such variations part'y to the unavoidable inaccuracy of our determination of composition by the analyses of samples or drillings; partly to segregation, and partly to the temperature and other features of mechanical treatment. To this list of possible causes, I think one more may be added—namely, the presence, condition and distribution of the sonims at the time of solidification.

The Elimination of Sonims

In molten decarbonized iron prepared in the converter or Siemens furnace there may be existing in the solid state any or all of the sonims silica, oxide of iron and oxide of manganese; and in the fused state some of the silicate of iron and manganese. The infusible oxides are probably floating or suspended as minute particles too small for gravity to affect appreciably, much as finely powdered silica and iron ore will float in water making it turbid, though with the difference that the steel does not wet such suspended matter.

The sonims at this stage have little or no power to flux each other, or to unite and form globules of larger mass. They are so thoroughly disseminated in the iron of the charge that they seem to act almost as if in solution, but are made insoluble or precipitated by the added manganese, the effect of which is to change their composition and lower their fusion points, whereupon they proceed to agglomerate and escape from the metal. This is the usual way of eliminating sonims, and if the addition of manganese be large enough and sufficient time be allowed after its addition before teeming the result may be tolerable as to the properties of the product.

In molten steel ready for teeming, as in the ladle, there may be the same sonims as in the decarbonized iron, but in very different proportions and conditions. They should all have become fused or fluxed and have been for the most part eliminated. Such gaseous impurities as are contained should be held more securely in solution than before the final additions.

In the solidified steel ingot or casting there should be still less of the sonims than in the steel in the ladle. Such gases as have not been worked out or kept in solution will have formed blow-holes in the steel.

The Silicates

Let us first follow the course of the silicates, which are perhaps the most deleterious of the sonims. The oxide of manganese formed by the reaction of a part of the manganese added with a part of the oxide of iron (with the formation of Fe O) fluxes the silica, forming a fusible silicate, the particles of which wet and join with each other when they touch, making larger and larger particles. The molten metal and sonims do not mix any more than oil and water, nor do the fused sulphides mix with either. The silica seems not to be able of itself to split up oxide of iron so as to combine with the Fe O resulting. Nor does metallic iron seem to be able to reduce Fe_3O_4 to Fe O as manganese does. At all events the iron oxide lacks for some reason the power which oxide of manganese in molten steel possesses to flux silica. When silica is high in soft steel it is often, if not usually, accompanied by high oxide of iron, while if they fluxed each other only one of them —the one in excess—could be high.

The agglomerating operation continues until the particles are large enough to be affected by gravity and to rise toward the top of the metal. Each fused sonim globule also wets any other similar particle which it touches in its travels, and unites with it to form a large particle. Oxides unite with oxides and sulphides with sulphides.

Sulphide of Iron

The sulphide of iron is a dissolved impurity whose chief harm seems to come from weakness imparted when hot, thus causing red-shortness in the steel. When metallic manganese comes in contact with the sulphide of iron it takes the sulphur from the iron, forming fusible and also insoluble sulphide of manganese, which is precipitated and at once begins to collect into particles which grow in size as they join with others of the same composition, until they reach the top of the metal, or until the steel has solidified sufficiently to prevent their further motion within its mass. This perhaps explains why there are at times discrepancies in the degree of red-shortness displayed by different steels having high sulphur and of about the same percentage. Apparently, as in the case of silicates, the finely disseminated sulphides of iron and manganese are far more injurious than the same quantity in the form of visible particles. True, it would be difficult at present to discriminate between red-shortness due to the various sonims, but it is not necessary as long as they all have similar effects and are amenable to the same treatment, that is, addition of manganese with allowance of time and gentle agitation.

If sonims do not wet each other, agitation will tend to retard their separation except (usually to a small degree) in the presence of a little manganese in the metal, or of an acid slag. Therefore, stirring before the final additions, though useful to dislodge dissolved gases, is usually of slight effect in cleaning the metal of sonims. The exceptions to the above statement about stirring may, of course, be so emphasized as to be sufficiently effective. That is, an amount of manganese which would be small compared with that in the final additions, or a strongly acid vitreous slag, or both together, would be effective, given enough time or agitation or both. The time is required for the reactions to be completed, and after that, for the sonims formed by those reactions to escape from the metal.

Low-Carbon Evolution Steel

In the low carbon evolution steel which has been considered, the stirring which results from the escape of the gas bubbles helps greatly the escape of the sonims which are then in the state of fusion and which continue to rise and enter the scum until the metal becomes too pasty or solid. The sonims which escape in the mold come chiefly from the interior parts of the ingot, which have remained molten longer than the metal near the outer surface. The latter congeals before the sonims have had time to collect and rise as completely as those in the interior parts.

In pneumatic process steel, as commonly made, the elimination, such as it is, takes place in the ladle and molds, though when recarbonized in the vessel a large part of the sonims is eliminated there.

When steel is killed so that it lies dead in the furnace ladle and molds, the conditions are in a sense unfavorable to the further riddance of son-

ims, because of the lack of agitation. Time will, of course, permit of the floating to the top of any globules of sufficient size; but the formation of globules from the finely divided sonims will proceed very slowly in dead steel. Stirring is as efficacious in agglomerating the fused sonims as it is in completing the reaction and collecting the precipitate in any other chemical operation. On such dead steel made by what I have termed the solution method, in which the escape of gas during freezing is nearly or quite prevented, no scum rises to the top of the ingot; and any sonims in the metal will remain there, though they will be unequally distributed throughout the ingot, similarly to the segregated elements, as in the case of the Watertown ingots already noted.

When the final additions to a charge of steel are made in the ladle, the conditions are unfavorable for the complete elimination of the sonims, though merchantable steel is made by following that plan. The most that can be hoped for is to reduce their quantity to tolerable limits and to have those present in the less harmful form of relatively large globules.

Elimination of Sonims in the Open-Hearth

In the basic open-hearth furnace, the sonims may be eliminated by allowing time for the charge to work, and by having a slag low in iron; but greater care will be required than in the case of the acid open-hearth. There is one feature of the basic process, however, which aids their continuous elimination, namely the reduction of metallic manganese from the slag by the carbon of the bath, the manganese entering in steel. This is never found to happen with acid steel. With the latter, once the manganese was all oxidized and eliminated from the metal, I never found it there until it was added in metallic form.

The practice of some steelmakers of adding a part of the manganese some time before tapping, and the remainder immediately before, or in the ladle, undoubtedly has an effect in eliminating the sonims by allowing more time for them to get into the slag after forming. Somewhat similar, in a lesser degree, is the practice of adding a part of the scrap to the molten bath. The resulting agitation, and the action of the manganese of the scrap, will cause early formation of fusible sonims, and therefore their removal.

Sonims are, and have been, commercially eliminated from steels in regular practice with tolerable results, even if the theory of the methods used has not been fully understood. Working-out, shaking-down and similar furnace practices, as well as the final addition of manganese, are measures whose chief effect, aside from giving the steel the desired composition, is to allow or facilitate the elimination of sonims from the metal. The various processes afford different degrees of completeness in the elimination of the sonims.

Freedom From Sonims

Well-made crucible steel should be the freest from sonims; electric steel next; then acid open-hearth steel finished in the furnace; and finally open-hearth and Bessemer steel made in the ladle.

In the first three processes the practically complete removal of the sonims is possible, though it may be said not to be usual. In the absence of definite information as to what good slower driving would do, commercial reasons, or the demand for a maximum output at a minimum cost, usually outweigh the tendency to clean up the metal to the greatest practicable extent, and will continue to do so, at least, until proper specifications for sonims based on their proved effect are made and enforced.

In the crucible and electric steel processes there are, or should be, no final additions for the purpose of deoxidizing the metal; and, therefore, there will not be formed, late in the history of the charge, any sonims which would have to be largely eliminated to secure the highest quality of product.

In the absence of fuller knowledge of sonims, and their effect on steel, it is hardly proper to make specifications regarding them. Of course, to fill usual requirements as to elongation, reduction of area and clean surface free from cracks and seams, demands that sonims be kept within limits. Generally speaking, from steel which is free from red-shortness when rolled or forged, and which meets the usual physical test requirements for structural steel, the sonims will have been eliminated to a reasonable degree and those present are collected into visible globules when the steel solidified. In the finer grades of steel, and particularly in tool steel, the elimination of sonims should be much more nearly complete.

A series of patents are now issuing covering various means of freeing steel of its sonims, some of which are based on methods long since well known to steelmakers.

New Catalogs

TOBIN BRONZE.—A 36-page booklet, issued by the American Brass Co., Ansonia, Conn., is devoted to tobin bronze and its various uses.

MANGANESE STEEL. — Special ground gears and pinions for electric railways, made of manganese steel, are discussed in a booklet issued by the Edgar Allen American Manganese Steel Co., Chicago. A bulletin, also issued by this company, is devoted to manganese liners for tube mills.

BY-PRODUCT COKE.—In a 12-page circular, the Atwill-Makemson Coal & Coke Co., Chicago, directs attention to the Hamilton-Otto and Joliet-Koppers by-product coke, for which it is sales agent. Views of by-product plants are shown and the advantages of this fuel are pointed out.

PUNCHES AND ROLLS.—An 8-page, illustrated pamphlet, issued by the Vulcan Engineering Sales Co., Chicago, is devoted to some of the machines made by the Rock River Machine Co., Janesville, Wis. These include punches, punches and shears, and plate-bending rolls.

SAWING MACHINES.—The Vulcan Engineering Sales Co., Chicago, has issued a 4-page leaflet describing its cold metal sawing machines. Several illustrations show various types and sizes of saws. These machines are designed for cutting rounds, squares, beams, channels, etc., and can be furnished for belt or motor drive.

CASE-HARDENING COMPOUND.—A 24-page booklet, issued by the Ideal Case-Hardening Compound Co., New York City, contains useful information and practical rules for case-hardening, pack-hardening and annealing steel. The instructions given are based not only on accepted theories, but on the practice followed in large manufacturing plants.

AUTOMATIC SMOKELESS FURNACE.—A handsomely-illustrated, 64-page catalog, issued by the Murphy Iron Works, Detroit, is devoted to this company's automatic smokeless furnace. The construction of the furnace in detail is shown in many halftone and line illustrations and views of installations in power plants throughout the United States and Canada are included.

GEARS.—The Foote Brothers Gear & Machine Co., Chicago, has issued a 240-page illustrated price list of its standard gears. The latter include spur gears, bevel gears, worm gears, rawhide pinions and reducers. The book also contains considerable information, in the form of tables, regarding the outside and pitch diameters of gears, weight and transmission tables.

ELECTRIC GENERATING SETS.—Gasoline electric generating sets, built by the B. F. Sturtevant Co., Hyde Park, Mass., are illustrated and described in a handsomely-illustrated, 24-page catalog issued by this company. These sets are intended for installation in isolated power plants and are built in three sizes, 5, 10 and 15 kilowatts, capable of lighting 200, 400 or 600 20-candle power tungsten lamps.

SWITCHBOARDS AND PANELS.—The General Electric Co., Schenectady, N. Y., has issued a 14-page, illustrated bulletin, describing its switchboards for small and isolated plants. A number of types of panels are shown for direct-current and three-phase current generators. Other bulletins recently issued are devoted to direct-current exciter panels, current limiting reactances, single phase motors, steam flow meter, long-life flame arc lamp, and motor-starting and speed-regulating rheostats and panels.

BIT OF IRON HISTORY

Showing Striking Contrasts in Prices and Production.

By Kirby Thomas

A time yellowed pamphlet included in one of the miscellaneous volumes on the literature of the iron industry in the New York City library is of opportune interest. It is entitled "Report of a General Convention of the Friends of Domestic Industry", and bears the date of Oct. 26, 1831.

It includes the report of a committee of 15 on the production of iron and steel and a reply and protest against a movement to prevent the then pending enactment of higher import duties on iron and steel. According to the statistics gathered, there were in 1831, 202 iron furnaces in operation in the United States, the output of which was 155,348 tons, representing a converted product of 90,168 tons of bar iron and 28,273 tons of castings. The industry had been growing rapidly, for, according to the committee, the output in 1828 was 130,881 tons, in 1829, 142,620 tons, and in 1830, 163,340 tons. Thus it was pointed out that the production of iron had increased in four years 25 per cent, but—and this was the burden of the argument—the market value of the product had increased only 5 per cent. The average price of bar iron in 1828 was given as $118 1/3 a ton. The importation of iron in 1829 was 32,750 tons. Other interesting prices were—axes, in 1818, $24 the dozen; in 1829, $12. Patent stoves (imported), 1828, $350 to $400; in 1830 (made in Pittsburgh) $125 to $150. The cost of a steam engine in 1830 had fallen half since 1823 "with half more work on them". In 1830 Pittsburgh manufactured more than 100 steam engines.

All these and more figures of similar import and interest were noted in a plea for "protective tax, if tax it be, for the duty does not fall upon the consumers of the importing country, but upon the producers of the foreign article."

A forecast of Pittsburgh's greatness is in one paragraph, which boastingly says: "The citizens of Pittsburgh are able to enter into successful competition with almost any other quarter in the fabrication of nearly every other article of necessity (in iron) and in one endeavor (the manufacture of steam engines) justly esteemed the proudest effort of human ingenuity, they have attained a degree of perfection which enable them to challenge comparison with the skill and experience of any nation whatsoever."

Pittsburgh has certainly made good the committee's boast, and as for prices and production the present-day figures were certainly beyond the remotest conception of the 15 iron masters who so earnestly recorded the conditions of the industry at that early day.

ELECTRIC FURNACE

Being Started at Lansdowne, Pa., For Castings—Other Units.

Operations are about to be inaugurated in an installation of a Rochling-Rodenhauser electric induction furnace at the plant of the Crucible Steel Castings Co., Lansdowne, Pa. This unit, which is of two tons capacity, will be devoted to the making of high grade steel for castings. Deere & Co., Moline, Ill., are now installing a ¾-ton Kjellin furnace in their plant for the melting of scrap for castings. These installations are being handled through the American office of Siemens & Halske, A. G., 90 West street, New York. It is announced by this company that the Oachner Huttenverein, of Rothe Erde, Germany, has closed a contract for a three to four-ton Rochling-Rodenhauser electric induction furnace, which will be employed for the melting of 80 per cent ferro-manganese. This is a two-phase furnace similar to the one recently sold to the Peiner Rolling Mills, near Peine, Germany. The Imperial Japanese Steel Works, at Wakamotsu, has also ordered a five-ton Rochling-Rodenhauser furnace for the refining of steel for ordnance manufacture. It has been arranged that all of the electric furnaces to be installed by Siemens & Halske in the United States and Canada will be manufactured in this country.

Rebuilding of Stack Almost Completed

The Central Iron & Coal Co., New York, has nearly completed the rebuilding of its blast furnace at Holt, Ala. The new stack will have a capacity of 300 tons per day. The entire output will be used by the foundry and additional iron will have to be procured for the pipe shop when it is working to its capacity. The extension of the Tuscaloosa mineral division of the Louisville & Nashville to Holt, a distance of 3.11 miles, is finished, and will be opened shortly.

ORE FREIGHT RATE

From Lower Lake Ports Defended by Railroads.

Washington, Nov. 19.—The defendant railroads yesterday began putting before the Interstate Commerce Commission their defense of the 96-cent direct Lake Superior iron ore rate from lower lake ports to Pittsburgh plants, the reasonableness of which was challenged by the Pittsburgh Steel Co. as to shipments to its Monessen plant.

James Wood, vice president of the Pennsylvania railroad lines west of Pittsburgh; D. T. McCabe, fourth vice president of the Pennsylvania company, in charge of traffic on the lines east; and E. C. Baird, general freight agent of the Bessemer & Lake Erie, were witnesses for the carriers.

Mr. Baird claimed that it costs the Bessemer road 59.74 cents per net ton to move the ore 151.88 miles; so that the suggestion of the complainants that a 50-cent rate would be adequate must necessarily be ridiculous. On cross examination, he told Wade H. Ellis that it is true the company carries ore for no one other than the United States Steel Corporation.

A. R. Kennedy, traffic manager of the complaining company, was put on the stand by the complainants to say that Mr. Baird's figures are padded.

Messrs. Wood and McCabe testified that the railroads could not stand reductions in the ore rate because they would be followed by reductions in nearly everything else.

To Establish Warehouse

Galveston, Tex., Nov. 19.—Under the firm name of Markle Bros., C. N. and F. B. Markle have made arrangements to establish at Galveston a large wholesale steel house. Both men were formerly associated with the Simmons Hardware Co., F. B. Markle having represented the company in Texas for the past 25 years. He resides in Palestine, Tex. C. N. Markle had charge of one of the company's large departments, but more recently has been president of the Markle Lead Works. The firm will also carry a stock of structural steel.

Will Reorganize. — A reorganization of the Humphreys Mfg. Co., Mansfield, O., maker of porcelain enameled iron ware, recently placed in the hands of S. N. Ford and Reid Carpenter as receivers upon application of the Hickman-Williams Co., Cincinnati, is being planned and it is expected that it will be effected shortly.

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The Revenue from Iron Imports

Talk of tariff for revenue naturally arouses fresh interest in recent experience as to iron and steel imports and the revenue raised therefrom. The revenue derived from iron and steel imports, including everything from scrap, pig iron, ferro-manganese, etc., on the one hand through machinery, hardware, cutlery, etc., on the other, but not including iron ore, has been as follows:

Quarter ended	
Sept. 30, 1911	$2,183,038.53
Dec. 31, 1911	2,257,481.80
Mar. 31, 1912	2,143,577.10
June 30, 1912	2,253,777.75
Fiscal year	$8,837,875.18

This is gross, not net revenue, for there is material used in the manufacture of exported articles, upon the exportation of which 99 per cent of the duty originally paid is refunded. Such operations, however, are by no means as extensive as they have been in times past, because prices abroad are high and in many lines there is not the profit there once was in using imported material subject to drawback.

Statistics are available, showing in great detail the classes of material imported, with the quantity and duty in each class. Even a cursory study of the data shows that the present revenue is not derived in any large part from importations of the more common materials, those which are first thought of when the iron and steel industry is mentioned. The revenue comes almost entirely from highly finished products, either steel of high quality, but in relatively rough form, or steel of more ordinary quality in highly finished form. Ferro-manganese, which is imported in very large quantities, relative to the domestic production, produced less than $200,000 of revenue in the past fiscal year.

In recasting the tariff the question is where a Democratic congress will look for revenue. If thought should turn to the high priced material which now furnishes revenue, it may be questioned whether a reduction in duties may not simply reduce the revenue, through there being no adequate increase in importations. If thought turn on the other hand to the cheaper commodities, the question is whether any considerable revenue could be raised by making attractively low rates. The present rates of duty upon pig iron, billets, plates, bars, structural shapes, sheets, etc., are only a very few dollars a ton, therefore a million tons of imports would produce only a few million dollars annually of revenue at the present rates, but still fewer millions at reduced rates. On the other hand, to deprive the American industry of a million tons of business a year would be a very serious matter. It would be a hopeless effort to try to secure any considerable revenue by reducing iron and steel duties. The fact is that there has been a pretty steady downward revision of the metal schedule in the last two or three tariff acts.

Light Steel Products Gain in Tonnage

Comment is frequently made that the light rolled iron and steel products have been gaining in tonnage much more rapidly than the heavy lines, and it may be of interest to present figures which measure the extent of the change in the past five years. The total tonnage has, of course, been increasing with considerable steadiness, taking a general average. Given a calendar year of full business activity throughout, a large gain would be shown in the total, but since 1906 we have not had such a year. The year 1906 was good throughout, while 1907 was good through October, with a bad slump in November and December. The next year was an off year throughout, while the second half of 1909 and the first half of 1910 alone were good. After this came a year, 1911, which was practically "off" throughout. It chanced that the total tonnage of rolled iron and steel was about the same in 1906, a year of very heavy demand and of full employment throughout, and 1911, an "off" year, so that the tonnages in the different lines may be compared very easily. To an extent rolled iron and rolled steel are interchangeable, and at any rate they serve practically the same consumptive purposes, so that the total of rolled iron and rolled steel may be taken. The actual figures, however, are given below for the two years:

	1906.	1911.
Rolled iron	2,186,557	1,460,615
Rolled steel	17,401,911	17,578,556
Total rolled	19,588,468	19,039,171

A glance at the figures of rolled iron and rolled steel from 1904 to the present time—iron and steel were not separated prior to 1904 in the official statistics—suggests that the production of rolled iron has been practically constant in years of full output, not gaining, as was the case with steel. Thus in a year of poor employment the rolled iron tonnage is less than in 1906, a year of full employment. If the industry runs full in 1913, rolled iron will do well to

equal the tonnage of 1906, whereas rolled steel will be about one-half greater than in 1906.

Production of the various lines of rolled iron and steel in 1906 and 1911 are shown below, in gross tons:

Rolled Iron and Steel.

	1906. Gross tons.	1911. Gross tons.	Change. Per cent.
Rails	3,977,887	2,822,790	—29.5
Structural shapes	2,118,772	1,912,367	—10.0
Plates and sheets	4,182,156	4,488,049	+ 7.6
Nails and spike plate	54,211	48,522	—10.5
Wire rods	1,871,614	2,450,453	+30.9
Rolled forging blooms and billets	206,110	231,115	+12.2
Merchant bars	3,992,200	3,047,362	—23.8
Reinforcing bars	*	258,741	..
Skelp, flue, etc.	1,528,585	1,980,673	+29.6
Splice bars	224,911	163,570	—27.3
Hoops	172,332	225,074	+30.8
Bands and cotton ties	408,018	342,810	—16.0
Sheet piling	*	22,827	..
Railroad ties	*	39,197	..
All other	851,672	1,005,621	+17.8
Totals	19,588,468	19,039,171	— 2.8

*Not separately stated.

The heavy products, it will be observed, uniformly declined, rails leading with a decline of nearly 30 per cent, and splice bars naturally declined with rails. Structural shapes declined 10 per cent. Merchant bars, perhaps usually classed as a light product, declined nearly 25 per cent. They are not, however, a light product in the sense of being used in light work, as is the case with wire and sheets. Nail and spike plate decreased, but that was undoubtedly merely the tendency to replace cut with wire nails. There are separate statistics of nail and spike production, and they show that while cut nails and spikes decreased, the total, including both cut and wire, increased over 20 per cent.

The light lines showed increase almost throughout the list, wire rods, skelp and hoops all increasing about 30 per cent, with remarkable uniformity.

A peculiar circumstance is that while hoops increased 30.8 per cent, bands and cotton ties decreased 16 per cent. Probably this can be explained by regarding bands simply as a form of merchant bars. The cotton tie production is not significant by itself, as it simply varies with the cotton crop.

The total of plates and sheets showed an increase of 7.6 per cent, but this means nothing, since plates are a heavy product and sheets a light product. Separating the item into plates, 12-gage and heavier, sheets (excluding black plates for tinning) 13-gage and lighter, and black plates for tinning, the following changes are shown:

	Per cent change.
Plates	— 8.0
Sheets	+26.3
Black plates	+38.2

In a sense, the above comparison is the most conclusive of all that the light products are gaining in tonnage much more rapidly than the heavy products, for as to form, plates and sheets are identical; there is merely a difference in weight, naturally coupled with a great difference in the character of the utilization.

In the long run, of course, no rolled product fails to gain in tonnage unless it is supplanted by something else. With full production all along the line, rails, for instance, will break their 1906 record, but meanwhile the light lines will have increased greatly in tonnage. An instance of this passed into history long ago. A record rail production was made in 1887, and it was not until 1899, 12 years later, that this record was broken. Meanwhile some of the other products had gained almost immeasurably.

Record Iron and Steel Exports

Iron and steel exports in the present calendar year promise to reach a total of about 3,000,000 gross tons. For the nine months ending September, the total is 2,227,183 tons, and estimates based respectively upon a continuance of the average rate for the nine months, and upon a continuance of the September rate come out at about 2,970,000 tons.

The gain in exports in the recent past is phenomenal. During the whole history of the American iron industry, exports did not reach one and a half million tons until 1910, that year showing 1,540,000 tons, while 1911 showed 2,200,000 tons.

Beginning July 1 last, the Division of Statistics has been reporting exports of three new lines in the tonnage table, and these are lines which it is probably not generally known are being exported to any extent. In the three months, July to September, the exports of these three new items were as follows, in gross tons:

Railroad spikes	3,132
Bolts, nuts, rivets, washers	5,408
Horseshoes	215

These are apparently inconsequential items, but they are being exported at the rate of 35,000 gross tons annually.

Realized prices on our steel exports are good, and quite comparable with domestic prices. When our own prices were lowest, there were many lines which sold at lower prices, f. o. b. Pittsburgh, than obtained in the markets of the world, delivered. Domestic prices have advanced materially since then, but foreign prices have also advanced, and as export sales are made for earlier delivery than many of the contracts in force in the domestic market, export prices at the present time still make a very favorable comparison with prices actually realized on current deliveries in the domestic market.

Doubtless much will be made of the fact, in the coming tariff discussion, that the American iron and steel industry is able to export three million tons of its products in a year. Attention should be directed more forcibly to the fact that in actual business the competition is in delivered prices, and for delivery in many important markets near the seaboard prices are much higher than at Pittsburgh, the basing point, on account of rail freights being high, often greatly exceeding ocean freights from foreign producing points to these same markets. The tariff has been dubbed "a local issue". In respect to this point, it comes down to a local basis, whether or not these particular localities are to be preserved as markets for domestic manufacturers.

No matter what may be one's opinion concerning the tariff, all will agree that a reduction in the tariff by the next congress is extremely probable, and that if our manufacturers are to be saved from very disastrous results of a lower tariff and keener competition from foreign lands, they must be prepared to go into the export business more intelligently and persistently than ever before. Hence, every carefully thought out method in that direction is to be commended.

MEN OF THE IRON TRADE

Henry F. Gilg has been appointed Pittsburgh representative of the Wilkes Rolling Mill Co., Sharon, Pa.

Col. Samuel E. Winslow, Worcester, Mass., head of the Samuel Winslow Slate Mfg. Co., has been elected to congress from the fourth Massachusetts district.

J. C. Davis, dean of the college of engineering of Marquette university, Milwaukee, Wis., has been appointed a member of the municipal harbor commission of Milwaukee by Mayor G. A. Bading.

W. M. Murray has accepted a position as manager of the sales department of the Advance Machinery Co., Toledo, O., manufacturer of woodworking machinery and glue-room equipment.

Donald Malcolm McIntyre, K. C., of Kingston, Ont., has been appointed chairman of the Ontario Railway and Municipal Board, in place of Hon. James Leitch, who has accepted a judgeship.

George S. Rawlings, for 25 years maintenance engineer of the Providence, R. I., plant of the American Locomotive Co., has retired. He was given a gold watch and chain by the employes.

John E. Stephenson, traveling machinery expert for the Minneapolis Steel & Machinery Co., Minneapolis, Minn., is seriously ill with typhoid fever at the American hospital, Mexico City, Mexico.

Thomas Hunter, for many years head of the machine shops of the Westinghouse Electric Mfg. Co., East Pittsburgh, Pa., has gone to South Chicago, Ill., to take a similar position with the Illinois Steel Co.

Effingham B. Morris, chairman of the board of the Cambria Steel Co., has been made a director of the United Gas Improvement Co., of Philadelphia, to fill the vacancy caused by the death of Clement A. Griscom.

Peter A. B. Widener, of Philadelphia, director of the United States Steel Corporation and prominent financier, celebrated his seventy-eighth birthday anniversary, Nov. 13. He was the recipient of many congratulatory messages.

Walter Machals, who has resigned from the office of Julian Kennedy, at Pittsburgh, to go with Westinghouse, Church, Kerr & Co., will be succeeded by W. C. Rott, lately resident engineer for Mr. Kennedy at the new Brier Hill Steel Co. plant.

O. B. Osborn, vice president of the Berlin Machine Works, Beloit, Wis., has gone on a trip which will include a tour of Japan, China, and the Philippine Islands, and may extend his journey to include Java. Mr. Osborn is making the trip for the benefit of his health.

Frank M. Lowden was chosen as a director of the Pullman Co., at a recent annual meeting of the stockholders, to fill the vacancy caused by the death of H. C. Hulbert. Mr. Lowden is a son-in-law of the late George M. Pullman. The retiring directors were re-elected.

President James A. Farrell, of the United States Steel Corporation, spent a part of last week in the Pocahontas coal region, looking over the interests of the Steel Corporation in that district. The trip was one of Mr. Farrell's periodic tours of inspection of the properties of the Corporation.

Albert C. Lorion, purchasing agent and traffic manager for the Wright Wire Co., Worcester and Palmer, Mass., is conducting an investigation of the coal situation in New York and Pennsylvania, for the Worcester board of trade, which has begun to inquire into the present prices and shortage of coal.

Mortimer C. Mack, who has been connected with the metal trade in New York City for the last 20 years, has joined the selling force of the Vernon Metal Co., and will give his particular attention to tin and lead. Mr. Mack was previously connected with Emil Baerwald and the American Smelting & Refining Co.

Councillor Samuel Osborn, a member of the firm of Samuel Osborn & Co., Ltd., Sheffield, Eng., steel manufacturers, has been elected lord-mayor of that city. He is a past president of the Sheffield Society of Engineers and Metallurgists, and has taken considerable interest in technical education.

Rupert Swinnerton has been elected president of the Hibuna Land & Iron Co., Hibbing, Minn. The company, which was recently incorporated, controls nearly 1,000 acres of mineral land on the Cuyuna range. Other officers elected were: Vice president, Matt Gersich; secretary, B. B. Beal; treasurer, T. C. Congdon.

Edward B. Cook, general manager of the Warwick Iron & Steel Co., Pottstown, Pa., who recently resigned to accept a position in the blast furnace department of Pickands, Mather & Co., Cleveland, was tendered a complimentary banquet prior to his leaving. The hosts were Mr. Cook's former associates at the Warwick plant and other friends in the iron trade.

Fred Kling has been appointed chief mechanical engineer of the Ohio works of the Carnegie Steel Co., in the Youngstown, O., district. He succeeds John Hulst, who has been promoted to the position of chief mechanical engineer of the Carnegie company at Pittsburgh. Mr. Kling, who is a graduate of a German university, has been in the engineering department of the Ohio works for some years.

J. M. Fitzgerald, who has been president of the Davis Coal & Coke Co., and later vice president of the Western Maryland railroad, has been made president of the Western Maryland railroad. Mr. Fitzgerald is said to be probably the youngest railroad president in the country. At one time he was assistant to the vice president of the Virginia Iron, Coal & Coke Co. He is a member of the American Institute of Mining Engineers, of the British Iron and Steel Institute and of the American Mining Congress.

E. W. Oglebay, of Oglebay, Norton & Co., Cleveland, was present at the dedication last week of the Oglebay Hall of Agriculture, Bethany college, Bethany, W. Va., which he had presented to the school. In a speech at the dedicatory ceremonies, Mr. Oglebay spoke of agricultural training and stated that every man should know how to till the soil. The need of more farmers, he said, had inspired his gift to the college. Mr. Oglebay has made numerous gifts to the college, the new hall costing $100,000, while at different times he has donated lands, wire fencing, a huge barn and gifts of money, which together aggregate another $100,000.

THREE MILLION TONS

Will be Exports of Iron and Steel Products For Calendar Year.

Iron and steel exports in September amounted to 248,746 gross tons, the total value of these tonnage exports, together with the non-tonnage iron and steel exports, being $23,286,040.

The tonnage exports showed a decrease of 34,000 tons from August, but were a trifle above the average of the eight months, January to August, inclusive. Judged either by the September exports or the nine months ending September, the calendar year's exports will total practically 3,000,000 tons, against 2,187,809 tons in 1911 and 1,540,895 tons in 1910.

IRON AND STEEL EXPORTS, GROSS TONS.

	September,		Nine months, ending September,	
	1911.	1912.	1911.	1912.
Scrap	4,416	5,759	62.012	78,721
Pig iron	9,947	21,282	95,325	193,979
Billets, sheet bars, etc.	19,754	24,499	181,178	224,446
Wire rods	1 734	6,057	12 830	48 180
Rails	38,210	40,226	349,942	353,120
Steel bars	10.919	21,412	93,716	149,774
Iron bars	1,578	2,997	13,880	16 261
Structural	16.284	25,021	158,457	217,345
Hoop, band and scroll	534	1,110	1,589*	7,996
Sh'ts and pl'ts	33,071	45,272	252,281	407,126
Tin plates	6 462	6,623	42,557	66,722
Barb wire	8,859	8.461	63,140	71.413
All other wire	10 108	11,343	95,461	115,822
Cut nails	1,130	399	8.286	7,831
Wire nails	2,096	4,628	35,156	56,363
All other, including tacks	1 073	269	9,584	7.207
Pipes and fit.	14,670	20,047	144,818	192,316
Railroad spikes	†	943	†	†3,132
Bolts, nuts, rivets, washers	†	1,633	†	†5.408
Horse shoes	†	26	†	†215
Cast radiators	305	739	2,650	3,806
Totals	181,150	248,746	1,622,862	2.227,183

*Not stated prior to July 1, 1911.
†Not stated prior to July 1, 1912.

The iron and steel exports in September, $23,286,040, compare with a value of all domestic exports in the month of $196,908,711, thus comprising 12.3 per cent, practically one-eighth, of all exports.

Of particular interest are the exports of sheets. These are included with plates in the table of exports presented herewith, for the reason that the separation by the government begins only with July 1, 1912, and the classification is open to some question. Until the date mentioned, the government returns included sheets with plates, but segregated iron from steel. The figures reported as exports of iron sheets and plates have been so large that the segregation has not been carried into our table, it being evident that a considerable tonnage of steel was being denominated iron. A reference to the official statistics of production establishes this conclusion, for the figures for iron plates and sheets, in gross tons, are as follows for the calendar year 1911:

Production	89,427
Exports	134,949

As the country cannot possibly export 50 per cent more than it produces, it is proved that the government segregation of iron from steel is not correct. Beginning July 1, 1912, a further division was made, and in this division the incongruity was introduced of distinguishing steel sheets from steel plates, and then separating the "iron", not into sheets and plates respectively, but into "galvanized" and "all other". This makes it look as if iron plates and sheets, either or both, are frequently galvanized, whereas when it comes to steel there is no galvanizing, only the distinction between plates and sheets. The government figures for September, precisely as reported, in pounds, are as follows:

SHEETS AND PLATES

Iron

Galvanized	26,295,311
All other	4,601,752

Steel

Plates	46,079,808
Sheets	24,432,827

In a general way, the inference may be drawn that about 24,432,827 pounds of steel sheets, uncoated, were exported in September, and about 26,295,311 pounds of galvanized steel sheets.

IRON AND STEEL IMPORTS, GROSS TONS.

	September,		Nine months, end'g September,	
	1911.	1912.	1911.	1912.
Scrap	948	1,741	14.371	13,114
Pig iron	7,875	11,886	115 874	89,557
Blooms, billets, steel n. e. s.	1,879	1,621	23 245	13,721
Wire rods	844	1,101	12,128	10.736
Rails	158	359	681*	2,854
Bar iron	1,645	1 344	20,840	18,137
Structural	345	290	626*	1,874
Sheets and plates	139	191	1,688	2,631
Tin plates	206	207	12,869	1,502
Totals	14,039	18,740	202,322	154,126

*Not stated prior to July 1, 1911.

IMPORTS BY MONTHS.

	1910.	1911.	1912.
January	56.207	33,071	20,008
February	43,613	20,812	11,622
March	54.176	23.533	15 466
April	47.698	22,392	12,482
May	42,569	23,347	15 955
June	30,322	29.399	21,407
July	41,933	15.782	17,916
August	36,879	19,944	20 572
September	30.961	14.039	18,740
October	31,455	21 035	.....
November	40 585	13,878	.....
December	31,575	19,665	.....
Totals	487,973	256,903	154,126

IRON ORE IMPORTS, BY MONTHS.

	1909.	1910.	1911.	1912.
January	105,233	284,823	102 600	154,118
February	61 749	170,427	94.820	129,693
March	108,676	165.633	134,785	157 469
April	74,782	206,135	133,900	178,502
May	97,393	240 833	217,467	194,482
June	124,714	193.415	118 296	180,122
July	172 316	248,810	200.845	185,677
August	209.855	282,949	175,183	178.828
September	164,613	208,892	184 456	180,571
October	178,051	219 571	172.459	.....
November	174,966	197,833	128.019	.....
December	222,609	173 719	148,902	.....
Totals	1,694,957	2,591,031	1 811,732	1,539,452

Iron and steel imports in September were 18,740 gross tons, showing a decrease of 9 per cent from August, but an increase of 10 per cent over the average of the eight months ending August. This increase was almost wholly in pig iron (including ferromanganese, spiegeleisen, etc.), but there was also a slight increase in blooms, billets, slabs and steel not elsewhere stated, the September imports being 1,621 gross tons, against an average of 1,512 tons in the preceding eight months. Most other items showed large decreases.

IRON ORE IMPORTS BY ORIGIN, 1912.

	September.	9 mths.
Spain	24	68,701
Sweden	25 236	280.309
Canada	14,902	61,766
Newfoundland and Labrador	25.075	100 335
Cuba	112.678	1,016,343
Other countries	2 656	11,998
Totals	180,571	1,539,452

September iron ore imports were 180,571 gross tons, against an average of 169,860 tons a month during the preceding eight months.

VALUE OF IRON AND STEEL EXPORTS—TONNAGE AND NON-TONNAGE.

	1908.	1909.	1910.	1911.	1912.
January	$13.468,058	$10,329.388	$14,513,394	$18,738 391	$18,451,914
February	14,063,559	10,947.159	13 949,082	18 693,792	21,801 570
March	15,168,155	13,873.746	17.258,503	22 591 991	24,474.799
April	15 455,319	13 058 207	16,529,260	24,916,912	26,789 853
May	11.281,415	12,964.367	17,658.042	20,616 795	28,050,247
June	11,677,944	13,779 736	16 503.204	20 310,053	24,795 802
July	12,085,951	11,866,772	16.108.102	17.454 772	24,913,052
August	12 058,561	14 134 487	17,628,537	20,013,557	25,450 107
September	11.221,799	12.966,908	16,776.178	19,875 308	23,286,040
October	11,505,063	14,249.598	17 452.085	20 799,591	.....
November	10,895 549	14,434,690	18,594,806	21.547,399	.....
December	12.231,741	15.069,246	18.300,710	22,186,996	.....
Totals	$151,113,114	$157,674,394	$201,271,903	$249,656 411	$213,699,572

EXPORTS OF TONNAGE LINES—GROSS TONS.

	1908.	1909.	1910.	1911.	1912.
January	74,353	70.109	118 681	152,362	151 208
February	81.773	84,837	110,224	150,919	204,972
March	96,681	94 519	124,980	216 360	218.693
April	93,285	100,911	117 921	228,149	267,312
May	64,041	109,808	135.306	178,589	307,656
June	69,770	114 724	120 601	174,247	273 185
July	86,796	100,850	127,578	162 855	272,944
August	86,244	105,693	131,391	177,902	282,835
September	76,732	97,641	119,155	181,150	248,746
October	85,766	110,821	129 828	186,234	.....
November	71,130	116 105	155,138	187 541	.....
December	77,659	137.806	150.102	190,938	.....
Totals	964,242	1,243.567	1,540 895	2,187,809	2,227,183

New Haven Causes Surprise at Rate Hearings

By Proposing to Introduce Valuation of Physical Properties—Examination of Witnesses, Temporarily Concluded, Will Be Resumed at Atlanta

The hearings on the complaint of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., and other shippers against the Louisville & Nashville railroad and other carriers, concerning the rate of freight on southern pig iron, was continued the last three days of last week before Interstate Commerce Commissioner McChord, in Washington, and was concluded Saturday, so far as that city is concerned. By agreement, additional testimony will be taken in behalf of the New York, New Haven & Hartford railroad, at Atlanta, Nov. 25, either before an examiner or a notary.

E. G. Buckland, vice president of the New Haven railroad, appeared before Examiner Boyle Friday afternoon with a request that witnesses for that carrier either immediately or on Saturday be heard. The request raised a storm of protest from all the attorneys in the case and Mr. Wimbish referred to the New Haven as a "tardy defendant," saying that it had ample notice to be present with its witnesses and to make such a presentation of testimony in its behalf as would assure the conservation of whatever interest it might conceive it had in the matter

Hearers Astonished

Mr. Buckland astounded those in the hearing room by saying that he desired to introduce a valuation of the physical property of the New York, New Haven & Hartford which had been made by a firm of chartered accountants; that firm, he said, had made an allocation of costs to freight and passenger traffic which he desired to place in the record so that it might be compared with the exhibits submitted by Mr. Muller. He said that the accountants which the road had hired arrived at conclusions widely differing from those of the expert put forward by the complainants. The New Haven's accountants, he said, had made the allocation between freight and passenger with only one aim in view, namely, that of affording an accurate view and not of bolstering up some particular claim.

Examiner Boyle said that he couldn't see where such a valuation had anything to do with the question in hand, but that he would not make objection. Mr. Calloway agreed with the examiner that physical valuation of the New Haven could have but little if anything to do with the question here involved.

Mr. Buckland intimated that the New Haven is determined to show that the value of its physical property is far in excess, probably $100,000,000 in excess, of its issues of stocks and bonds.

J. P. Muller, a lawyer and accountant, who early last week had filed elaborate exhibits tending to show that the southeastern railroads had prospered more during the last 10 years than in others, and that they can well afford to reduce the rates, was cross-examined at length.

C. B. Phelps, superintendent of transportation of the Louisville & Nashville, was put on the stand to disprove the allegation that there is practically no empty car movement in connection with pig iron trade in the south. Mr. Phelps said that this is obviously not a fact. He said that empties are brought from as far south as Pensacola and New Orleans. In cross examination, the witness said that the preponderance of traffic from and to Ohio river crossings at times is south bound and at times is north bound.

B. H. Stanage, assistant general freight agent for the Frisco, who formerly held that position on the Chicago & Eastern Illinois, said that the proportional of $1.60 from Evansville to Chicago, equal to $1.428 per net ton, yields a return to the Chicago & Eastern Illinois of only $1.10 per ton or 3.8 mills per ton per mile on 65,000 tons carried annually. The shrinkage is due to the fact that the C. & E. I. must pay heavy switching charges in Chicago because few of the consumers are on its own rails. On coal the C. & E. I. makes 3.7 mills per ton per mile on seven and a third millions annually. He said the Frisco would lose $73,000 annually if the rates were reduced $1, because that is the tonnage it carries to St. Louis, via Memphis.

He Had Some Figures

Lincoln Green, freight traffic manager of the Southern, an able statistician, was Saturday's witness. He agreed with Mr. Muller on so few things, even in the figures relating to production and shipment, that the instances in which they agreed could be enumerated on the fingers of one hand. He testified that so far as the Southern is concerned, there is more empty movement on account of pig iron than there is of loaded, and that pig iron constitutes only a little more than 1 per cent of the Southern's freight.

Mr. Green did not agree with the statistics as to shipments of pig iron from Birmingham and Chattanooga districts. He said the assertion of the complainants that production and shipments steadily increased until 1907, since when they decreased, owing to the high rates to the Ohio and Mississippi river crossings, is not correct. For the five years following 1907 the production was 4,641,000 tons, while for the five years preceding the production was 4,346,823 tons. The witness also traversed nearly every other assertion of the same general character. As to pig iron moving in solid train loads, he said the six roads serving the Birmingham district receive from the eight district shipping points enough carloads of pig iron daily to make up 1.6 trains of 30 cars, of an average loading of 27 tons. He said that even if the L. & N., the carrier that hauls most of the pig iron to the river crossings, received half of the tonnage, it would receive only part of a train load.

Solid Pig Iron Trains Rare

Mr. Green said the talk about pig iron moving in train loads is foolishness. It moves the same as any and all other carload freight. It is carried in trains with other freight. Those trains have to be broken up at junction and terminal yards and switched so that switching costs for pig iron are just as high as for any other class of freight. The complaint says the switching cost is less because of the so-called "solid train" movement.

He said that solid merchandise trains are common, while solid pig iron trains are rare. It is incorrect to say that pig iron makes a larger return per car than does merchandise. He took a typical week, showing that the return of seven tons of merchandise from Pinner's Point to Birmingham was greater than on 30 net tons of pig iron from Birmingham to Pinner's Point, where the Southern received the merchandise freight from the east

by boat, and turned over pig iron to the water carrier. He said that the steamship lines are not anxious to carry pig iron because of the great amount of expensive handling. To prevent claims of damage on account of mixing, the Southern carefully preserves the identity of each carload of pig iron on the wharves at Pinner's Point and the steamship preserves the identity in the ship itself, thereby hurting the pig carrying capacity of the ship.

Before going to that phase of the subject, Mr. Green presented figures to show that the Southern has done its share to increase the efficiency of its road and equipment by eliminating grades, double-tracking, increasing the tractive powers of its locomotives, the loading capacity of its cars and the commercial loading of its cars. All these increases in efficiency, however, have been neutralized by increases in wages to train crews and hoisted taxes.

C. B. Compton, freight traffic manager of the Louisville & Nashville, gave what he stated is a complete history of southern railroad rates on pig iron for the last 32 years. He said there never was a sliding scale to govern pig iron rates except during one year, beginning Feb. 4, 1880. He declared that the $2-rate from Birmingham, Ala., to Louisville, Ky., which went into effect in the latter part of 1894, was "a panic rate, made when the railroad company thought everything was going to smash, including itself." It made that rate, and also reduced the rates on assembling raw materials from 25 to 50 per cent with the hope the tide of bankruptcy might be stemmed by giving the furnaces one more chance to keep going. The theory was that if the furnaces could do some business, the railroads would also be benefited. He said the move turned out to be extremely disastrous. The rate has been used, or sought to be used, as a measure for every other kind of rate since it was made.

Mr. Compton presented 31 exhibits, each tending, he claimed, to show that the southern furnaces at no time suffered in comparison with the northern, because of their low assembling rates. On the basis of a formula including 1.4 tons of coke, 1-3 ton of limestone and 2.25 tons of iron ore, he figured that the assembling cost for Bessemer, Ala., iron is 52.66 cents; Thomas, Ala., 53.36 cents, and Ensley, Ala., 53.72 cents. He also put in assembly cost figures for the Pittsburgh valleys, Wheeling, W. Va., Canal Dover, O., Johnstown, Pa., Columbus, O., and Zanesville, O., districts. He took the figures for making up his formula of raw materials from testimony submitted in the complaint of the Pittsburgh Steel Co. against the carriers serving it. That formula includes 1,838 gross tons of iron ore, 1,117 net tons of coke and 0.481 gross ton of limestone. The assembling costs, as stated by him, are as follows:

Pittsburgh, $4.9660; Beaver, Pa., $4.7590; valleys $4.7568; Wheeling, $4.8466; Canal Dover, $4.8848; Johnstown, $5.0790; Columbus, $4.8052, and Zanesville, $4.8816.

In making average rates on iron ore from Lake Erie ports, he estimated that 80 per cent was direct and 20 per cent dock ore.

J. H. Frantz, of the Columbus Iron & Steel Co., Columbus, O., submitted a table to show that the delivered price is what defines the market for any given furnace. He said that on such a basis, the southern Ohio furnaces are at a great disadvantage compared with their southern competitors.

J. S. Stilman, secretary and treasurer of the Empire Steel & Iron Co., Catasauqua, Pa., submitted figures as to the rate of increase in production of the two groups of furnaces—eastern Pennsylvania and Alabama—and figures concerning stacks out of blast. He explained the zones of competition of the Pennsylvania and Alabama furnaces.

SHIP BUILDING PLANT

Will be Established at St. Johns—New Canadian Companies.

Ottawa, Can., Nov. 19.—A steel ship building industry will be established at St. John, N. B., by the Norton-Griffiths Construction Co. W. Burton Stewart, general manager for Canada of the company, has announced its acquirement of the charter of the Imperial Dry Dock Co. It will construct in Courtenay Bay, N. B., a dock of 1,150 feet length. The dry dock and ship repairing plant will be developed into a large steel ship building industry, while iron and steel works may also be established on the site adjoining the dry dock.

Aluminum Castings, Ltd., a new industry backed by Detroit capital, has located in Ottawa, Ont. T. R. Sedley, vice president of the Columbia Castings, Ltd., Detroit, is president of the new concern, which will manufacture brass, bronze and aluminum castings. Operations will be commenced within two months.

Kenora, Ont., is calling for tenders for a sewer system and sewage disposal plant.

Toronto, Ont., has under consideration work which will require $230,000 worth of 36-inch cast iron pipe for water mains.

The George White Co., manufacturer of threshing machines, London, Ont., is planning an addition to its plant. New buildings will be erected and additional machinery installed.

W. Henry, of Chicago, is taking over the plant of the London Foundry Co., London, Ont., and will manufacture the Mitchell auto. Plans are being prepared for the extension of the present plant by Manager D. Cowan, of London.

The International Malleable Iron Works will erect a foundry at Guelph, Ont. The foundations are already in and the building well under way.

The Hamilton Bridge Works Co. is building a $5,000 extension to its factory at Hamilton, Ont.

The Prince Rupert Hydro-electric Co. will start work shortly on a power plant at Prince Rupert, B. C.

London, Ont., will build an electric railway to cost $890,000. S. B. Storer, of Syracuse, N. Y., is construction engineer.

Plans have been drawn for a new pumping plant for Montreal, Que., to cost $32,000. It will have a stone foundation, brick and structural steel construction.

The Fisher Machinery Co., Ltd., Hanover, Ont., has been incorporated at Ottawa with $50,000 capital to conduct an iron foundry and machine and repair shop and to manufacture and deal in machinery. The incorporators are Daniel Knechtel, Jacob Stadelbauer Knechtel, Henry Peppler, William Henry Fisher, Benjamin Frederick Ahrens, Henry Horton Miller, James Henry Adams, Henry H. Engel and Arthur William Fisher, all of Hanover.

The Wilt Twist Drill Co. of Canada, Ltd., Walkerville, Ont., has been incorporated at Ottawa with a capital stock of $150,000, and the following incorporators: Hobart Anderson Springle, Sidney Cecil Robinson, Walter Chater, Edgar Francis Ladore and Hiram Holicomb Walker, all of Walkerville. The company will manufacture and deal in machines, engines, tools, instruments and mechanical and electrical supplies.

J. B. Baillargeon Express, Ltd., has been incorporated at Ottawa with Montreal head office, to manufacture and deal in tools, implements, motor and other vehicles, engines, steam plants, etc. It has an established capital of $1,500,000 and its incorporators are Messrs. Clovis Joseph Baillargeon, of Outremont, Que., Romeo Gaudry, George Lefort, Rene Beauchemin and Joseph Treffle Primeau, all of Montreal, Que.

MINING NEWS FROM THE IRON RANGES

Miners Leaving Lake Superior Region

Labor in the Lake Superior iron region has been none too plentiful this season. An actual scarcity has, in fact, existed in most districts. This condition is expected to continue throughout the winter. While it is customary to curtail surface operations with the coming of cold weather and snow, each fall witnesses a large migration of foreign workmen to various countries in Europe. This movement this year is already in progress and it has been stimulated because of the Balkan war.

Men Going to Balkans

Free transportation across the ocean, together with the dictates of patriotism, has prompted an unusually large number of Bulgarians, Montenegrins, Servians and Greeks to depart from the region, the most of these from the Mesabi range and some from the Iron River and other old-range districts. The result is seen in the continued complaint of labor shortage notwithstanding the time of year when ore production naturally is curtailed. Skilled miners are in demand particularly. A similar labor shortage exists in the lumber woods. One hundred men are needed at the Cleveland-Cliffs Iron Co.'s Negaunee mine, Marquette range, where a fine new shaft and a complete and costly new surface plant recently went into commission. It is intended to employ large crews in both the new and old portions of the property throughout the winter. The Cleveland-Cliffs company's Maas mine at Negaunee will be employing 200 men by the first of the year. Operations were resumed three months ago, since which time the force has gradually been increased to 165 men. The Breitung interests are operating their mines at Negaunee practically to capacity. The stockpiled ore has all been shipped and the product now mined is going forward about as fast as hoisted. The Cascade Mining Co., which recently started the development of a property in the Cascade district of the Marquette range, has 50 men employed and is pushing the work of shaft-sinking night and day. The force will be increased as fast as room for additional men is made. While the Volunteer mine, the principal property in the field, is idle, the owners declining to sell its product at present market prices, the outlook in the Cascade district was never better than at this time. The discovery of large bodies of ore of good grade and the opening of a new mine by the Cascade company have given the region new life. Ore is being hoisted at the Cleveland-Cliffs company's Barnes mine, in the country west of Ishpeming, Marquette range. Operations were resumed recently, after a suspension of a year. As the Barnes is a new mine, with limited openings, it is not expected that a force much in excess of 50 men will be employed during the winter months. The shaft, now down 300 feet, will be deepened and new drifts opened. Ore extends both to the west and east and eventually the mine will be an important producer. The Barnes is 300 yards northeast of the old Dexter property, which was abandoned a dozen years ago after the operating company had failed to find a deposit in which it could mine profitably. The Barnes is on an entirely different vein than that on which the Dexter was developed.

Trouble With Water

The United States Steel Corporation's big Chapin mine at Iron Mountain, Menominee range, has recently experienced trouble with water such as caused great annoyance in former years. The Chapin not only makes much water regularly, but at times is afflicted with excessive flows, on which occasions it is sometimes necessary to utilize not only all the pumps in the mines, but bailers of large capacity. The most recent occurrence of this nature was when a "vug" was tapped in the 16th level of the Hamilton shaft and that level and the 15th level were suddenly flooded. As a precautionary measure, all the men in all the workings were ordered to surface. Mining was resumed 36 hours later. While the "vugs", usually cavities of varying size, are a matter not as clearly understood as is desirable, it is believed that the latest excessive flow came from the 12th level, where the water had been dammed for several years. As a general proposition, the Menominee range mines are wetter than those of any other Lake Superior district, the Lake Embarrass region of the Mesabi excepted. This is because of the limestone formation, a stratum which, wherever it exists, is noted for generally aqueous conditions. The water finds its way for surprisingly long distances through limestone, and the deeper the shaft the greater the area drained and the more water handled. Were it not for the fact that limestone beds of the Iron Mountain field average a pretty sharp dip it is likely underground mining would be impossible.

Florence is Idle

With an outgo of 100,000 tons, Ladenberg & Thalman's Florence mine, Menominee range, has suspended shipments for the season. All the ore in stock was sent out. It is intended to operate briskly during the winter and to employ both day and night shifts. A mile to the east and between the villages of Florence and Commonwealth, Wis., the company is pushing development work at the new Ernst property. A miners' change house is in course of construction and an ore crushing plant has been contracted for. The force of employes is being augmented as opportunity offers. Electrical power both for the Ernst and Florence properties will be furnished by the Peninsula Power Co., of Iron Mountain, a contract for the service having recently been signed. Ladenberg & Thalman are active in their search for ore on the Menominee range and are making liberal use of the diamond drill. Exploration is in progress both in Florence county, Wis., and Iron county, Mich. One of the principal mines of the Crystal Falls district will be the Ravenna property, now being opened by M. A. Hanna & Co., of Cleveland. The deposit is extensive and the quality of the ore better than the

average in the field. The Ravenna adjoins the Carpenter tract, where the Hanna interests have found one of the biggest bodies of ore yet encountered in the western portion of the Menominee region. In the Iron River district, the Jones & Laughlin Steel Co. is hoisting ore at the new Forbes mine, the installation of the equipment having been completed. At the Rogers Iron Mining Co.'s new Rogers mine, the shaft has been put down approximately 1,000 feet and the work of drifting has been started. Sinking has been in progress for upward of a year.

New Mine

A fine new mine will be added to Pickands, Mather & Co.'s Menominee range group when the Bengal property at Palatka begins production. The shaft is close to the required depth and drifting will be commenced about the last of November. A steel headframe 105 feet in height will be erected this fall or winter. The surface equipment will include an engine house, now in course of erection; a transformer house, and a miners' change house, all of fireproof construction. Eleven dwelling houses are to be built at once, and additional structures of the same kind next spring. At the Caspian mine, in the same locality, Pickands, Mather & Co. have had erected a central office building from which the Menominee range operations will be directed. Residences for the officials are being built. The shaft house at the Caspian, recently destroyed by fire, has been replaced by a temporary structure. The latter will give way next spring to a headframe of steel. Corrigan, McKinney & Co., of Cleveland, are pushing work at the Tully mine, an Iron River property at which operations recently were resumed. A contract for the erection of 44 dwelling houses has been awarded.

Hustling Operations

The Winston & Dear Co., which is stripping the St. Louis property, near Chisholm, Mesabi range, for the Great Northern interests, now has three steam shovels employed and is hustling the operations. Three hundred men are on the payroll. The stripping will be continued throughout the winter. At Mountain Iron, the Rogers Iron Mining Co.'s Iroquois mine has been restored to the active list, after an idleness of one and one-half years. With 150 men employed, mining will now be prosecuted steadily. At Gilbert, the Steel Corporation is enlarging the stockpile grounds at the Gilbert mine, it being intended to operate with vigor all through the cold-weather season. The office building has been removed to a new site, because found to occupy ground containing ore. Another winter operator on the Mesabi will be the Cleveland-Cliffs company's Crosby mine at Nashwauk. Stockpile ground sufficient for the storage of 75,000 tons is being prepared. The Sellwood company's Pearson property at Nashwauk has closed for the season, as is customary. The 100 men discharged readily found work.

The mines of Itasca county, which carries the westerly continuation of the Mesabi range, produced 4,622,191 tons the last fiscal year, according to the mining inspector's annual report. This was a million tons in excess of the production for the preceding year. A total of 2,230 men were employed, and the average wage was $2.64. There were four fatal accidents. The mines are the Canisteo, Hill, Holman, Crosby, Hawkins, Pearson, LaRue, Bray, Forest, Alexandria, St. Paul, Platt and Mississippi.

ACTIVE WORK

At Steel Corporation's Mines During Winter.

Although ore shipments will soon cease, the coming winter will probably witness unusually active work at the underground mines on the Lake Superior ranges, particularly those of the Steel Corporation. D. G. Kerr, vice president of the Corporation, recently made an inspection of the Oliver Iron Mining Co.'s mines, accompanied by W. J. Olcott, president; Pentecost Mitchell, vice president; John H. McLean, general manager, and J. H. Hearding, assistant general manager of the Oliver company. The trip occupied about two weeks and covered all the ranges in the Lake Superior region. In connection with the winter's work, Mr. McLean said, on his return:

"The shipping season for iron ore may be expected to close soon, as cold weather under normal conditions is due to arrive, but production will continue at the underground mines of the Oliver Iron Mining Co. during the winter. It will probably be a more active winter than last, and the production for the period somewhat larger than a year ago. We shall do some mine stripping this winter, and in general make ready for another busy season in 1913, the prospects for which are good at this time."

CROTON IRON MINES

Will be Reopened For Concentration —Long in Litigation.

Announcement is made that the magnetite iron ore deposits located between the villages of Brewster and Croton, N. Y., which have not been worked for many years, are again to become active under the control of the Croton Magnetite Iron Mines Co., a newly formed corporation with offices at 165 Broadway, New York. The Croton iron mines have gained considerable prominence through the several years of litigation between the owners and the city of New York, which was carried on in connection with the establishment of a water reservoir for the metropolis occupying part of the mine property. This suit was finally terminated some months ago and arrangements are now being made to re-open the mines for the first time since 1883. Hamilton & Hansell, 50 Church street, New York, mining engineers, have been retained by the owners and are now preparing plans for the development of the mine. It is planned to install a concentrating plant for the magnetic separation of the ore, which will have a capacity of about 150,000 tons annually. A crude ore output of about 300,000 tons annually will be required for filling the concentrating capacity. The ore, which runs about 37 per cent natural iron, will be beneficiated to about 64 per cent in the concentrates. After concentration, the material will be passed through a sintering process for the elimination of sulphur. The present workings of the mine consist of two shafts and a tunnel 1,150 feet in length. Levels have been opened at 80 and 150 feet below the surface. Some preliminary outdoor work toward putting the property in working condition is now being carried on, but it is probable that the mine will not be able to ship concentrated material before next summer. E. P. Earle, of New York, president of the Nippissing Mines Co., heads the new company which will develop the Croton mines.

The Chicago & Northwestern Railroad Co. is ready to start work on replacing its No. 1 ore dock at Ashland, Wis., with a concrete and steel structure of latest design. The work will be carried on throughout the winter and the new dock will be ready for the receipt of ore at the opening of navigation.

BRITISH AND CONTINENTAL MARKETS

BRITISH IRON TRADE

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Nov. 11.

London, Nov. 19. (By cable.)—Cleveland warrants, 68s 1½d, an increase of 3d since Friday.

Pig Iron.—The rapid progress of the war, and the prospect that transit will not be greatly interfered with, have restored confidence and business is proceeding on quite normal lines. The month of October finished very well, with selling prices at Middlesbrough at 67s ($16.40), exactly the same as at the beginning of the month. The amount withdrawn from store was 23,000 tons and the amount now in store 254,000 tons. Sales for one month are 67s 4d ($16.48), and three months 67s 8d ($16.56). The remarkable steadiness, in spite of international and political disturbances, is convincing evidence of the soundness of trade and a large demand. At present, there are in Cleveland 45 furnaces making Cleveland pig iron, and the monthly output has been increased 13,000 tons, as compared with a year ago. A peculiar feature is that buyers are holding off almost to the danger limit, and there must be a scramble for material shortly. There was a clamor for reduction from the very high figure now prevailing, buyers naming even 2s 6d and 5s reduction from offered quotations. Sellers scout this suggestion almost with scorn, and they are merely sitting tight and waiting for the business which they believe must come along a little later. Their position is fortified by the phenominal dearness of coke. The coke scarcity has never overcome the effect of the coal strike. In the meantime, purchases are restricted to small lots for immediate wants; but even on these the buyer gets the worst of the deal, as he frequently has to pay a premium for getting his needs attended to. Many of the furnaces are booked right through the first quarter. The smelter, in his turn, rages against the dear coke, and it is frankly admitted that the coke vender has the market under his thumb and can practically sell when and at what price he likes. There is increasing strength in the hematite department, and material is very scarce indeed. There are 42 furnaces making hematites, and special irons, against 34 this time last year. There is no stock, and no prompt iron available. Prices range between 80s and 82s 6d for East Coast mixed numbers. In the Barrow district, the introduction of several additional furnaces has hardly affected the pressure for delivery. Consumers are more disposed to buy hematite than ordinary pig iron, any reduction in that department being altogether hopeless.

Finished Iron and Steel.—Several features of the finished and semi-finished departments connected with the boom are causing concern. While material is much needed, the most urgent need at present is for workmen. It is impossible to get sufficient men, especially in Sheffield; and there has been so much overtime there that workmen are beginning to rebel and clamor for more leisure. There is every probability that output will be somewhat restricted in the early future, while the cost of labor is pretty certain to increase. The scarcity of billets is causing trouble on all hands. In the lighter Sheffield trades, many mills find their output reduced through spasmodic and insufficient supply of billets, wire rods, etc. Continental supplies appear to be increasingly unavailable, and the prices asked for the small supplies on offer do not encourage business.

Two great consuming departments of construction must insure great activity for some time to come. Since the last boom, practically a new trade has sprung up in the construction of buildings with reinforced concrete. It does not require a large building to consume a few hundred tons of iron and steel in this way, and the use of this form of building is increasingly popular, owing to its greater safety against fire. Hundreds of buildings up and down the country are clamoring for iron and steel for construction and renewals. Undoubtedly, new works will have to be built for the supply of a continuous need in this department, for some years to come.

A huge quantity of steel is going into ship construction, but a still more imperative need is for railway steel, which is demanded practically by every railway in the kingdom. In the Midland district, the want of rolling stock is impeding almost every industry, and railways having wagons out on lease have called them in again. Although the weather is extremely favorable for transit, there is congestion on all hands. It is notorious that the railway building works are overwhelmed with work, and this week the Great Western railway has given out orders for nearly three thousand wagons to private building firms. For the movement of heavy material, the fullest possible use is being made of primitive barge haulage, on the local canals, and many firms have been very thankful to be able to fall back upon this alternative.

There has been no material change in prices during the week. The South Yorkshire Bar Iron Association met at Leeds on Monday, and agreed to continue the quotation of £8 10s. There is still a fair amount of buying of bars. The only sign of weakness is in common iron for nuts and bolts, fences, etc., in regard to which makers are taking 2s 6d to 5s less than they were. But this is partly to resist a certain amount of Belgian competition. The heavy increase in railway traffic, as shown by recent returns, is taken as indicating heavy demand in this line for some time to come. Several large additions have been made this week to Indian railway orders, and in the armament department, the war has already stimulated a demand upon naval shipbuilders both from the British navy and for foreign countries. There is a decided boom in high speed steel, and a peculiar result of the enormous demand for special steels is that several Sheffield houses have ceased sending out travelers, while others have directed their representatives to bring home as little business as possible. A number of extensions are in progress at the Sheffield works. The tin plate trade continues to feel the effect of the war, and two or three mills have been laid idle through the practical cessation of demand for the Russian oil trade. While the trade continues fairly active, it is impossible to get improved prices, and there are great complaints of the extremely narrow margin of profit at present prices. Similar complaints are heard with regard to galvanized sheets, the price of

which is, in the general view, cut much more finely than it ought to be.

RUSSIAN IRON TRADE

St. Petersburg, Nov. 6.

The iron industry in the Urals has picked up wonderfully after a prolonged and ruinous depression and the production this year compared with last shows a substantial advance in the production of half finished and finished iron. The pig iron famine that endured so long is no longer so difficult to deal with. The workmen have been regularly employed and practically as regard the Donetz basin the exceptional circumstances such as pestilence that drove the workmen from the blast furnaces and led directly to the shortage of pig, have long ceased to exist; so that the furnaces are not only working normally but at high pressure and delivering more pig iron on the local market than they ever did before.

BELGIAN IRON TRADE

Brussels, Nov. 7.

An important transaction has taken place between the State railways and the Metallurgical Works. It included items as follows with corresponding prices: Angles, 17.49 francs ($3.32), some competitors quoting as high as 25 francs ($4.86) and girder iron 19.49 francs ($3.70). One or two parcels of angles were bought as low as 16.89 francs ($3.20), the high price submitted having been 21 francs ($4). The house that made the lowest quotation was the Comptior des Acieries Belges.

Pig iron has remained unchanged in price during October. The consumption since the beginning of the year is computed at 2,315,000 tons, against 2,043,000 tons a year ago. Thomas and foundry iron are at 81 francs ($15.39) to 83 francs ($15.77), compared with 65 francs ($12.35) to 67 francs ($12.73) and 67 francs ($12.73) to 69 francs ($13.11) a year ago. Scrap iron is now quoted 2.50 francs (47.50 cents) higher than at the beginning of October. Semi-finished continues scarce with an increased export demand. Bar iron has ruled quieter lately for new business, but the mills have sufficient work until practically the end of the first quarter of next year. Iron bars are quoted six pounds three shillings ($30.75) to six pounds five shillings ($30.25) and steel bars six pounds five shillings ($30.25) to six pounds seven shillings ($30.75). Plates are very active, especially for boiler-making and shipbuilding; the present quotation is six pounds 16 shillings ($34) to six pounds 18 shillings ($34.50). Sheets are quieter at seven pounds two shillings ($35.50) to seven pounds four shillings ($36). Rails are active for both home consumption and export; the present price is five pounds 10 shillings ($27.50) to five pounds 14 shillings ($28.50). Girders are doing well for export on the basis of five pounds 16 shillings ($29), and hoop iron has been better during the past month.

GERMAN IRON TRADE

Berlin, Nov. 6.

The pig iron syndicate of Germany has authorized the sale of Luxemburg iron during the first half of 1913 at an average rise of 3 marks (70½ cents) per ton.

The imports of iron ore into Germany during the first nine months of this year amounted to 9,149,017 tons and the exports 1,664,686 tons against 8,372,290 tons and 1,973,566 tons in the corresponding period of 1911. The market shows no outward sign of being influenced by the Balkan troubles; but it is admitted that new business is not coming along so freely. On the other hand, old orders are far from exhausted, and the metallurgical works are assured of full occupation for a long time to come.

It has been reported that some business has been done in bar iron at 1 mark to 2 marks below the average price; but this has been contradicted. At the general meeting of the Steel Syndicate, it was stated that for semi-finished, the home trade continues very well occupied, in view of the uncertain outlook, but the fixing of the selling price for the first quarter of 1913 has been postponed to the next meeting. Most of the new contracts with the state railways for rails, sleepers, and small iron have been concluded. Foot rail export is most satisfactory and orders on hand larger than a year ago. New business in pit rails is somewhat quieter on spot, but forward orders are good. Grooved rails are active for both home and foreign trade, and the mills have large orders on hand. Shape iron for home consumption is satisfactory and business is on a larger scale than a year ago, although building is affected by the less favorable weather, and monetary stringency. Girders are doing well for exports; the active trade with the Balkans has been cut off, but is more than made up by larger requirements of other countries.

FRENCH IRON TRADE

Paris, Nov. 7.

The iron and steel works of France remain very busy, and buyers are troubled about getting prompt delivery. There appears to be no slackening in business, and to deliver to time the workmen are being hard pressed by the masters. The price of cast iron has been fixed by the Longwy Bureau at 90 francs ($17.10) for No. 3 on rail at the factories, and there are houses willing to make contracts up to the end of 1913 at this price, which marks an advance of 5 francs (95 cents). Business is exceedingly active in every branch of the industry.

Prices in most instances have further advanced, and tend still higher. The advance of pig iron is, however, to a large measure due to the increase of the price of coke. The Paris plate mills have large orders on hand and sufficient work for some considerable time to come. Sheets have not undergone any material change, the quotation here is 270 francs ($51.30) to 280 francs ($53.20) for 3 millimetres in the center, 360 francs ($49.40) to 265 francs ($50.35), and in the north and east 250 francs ($47.50) to 260 francs ($49.40). Iron bars are quoted here 205 francs ($38.95) to 210 francs ($39.90), and steel bars up to 220 francs ($41.80). In the Loire and center the quotation is 205 francs ($38.95) to 210 francs ($39.90) for steel bars, and in the Marne 200 francs ($38). Iron bars in the north command 185 francs ($35.15) to 190 francs ($36.10). Girders are held at 230 francs ($43.70) to 240 francs ($45.60) here, and the trade for this time of the year is unusually active. Hoop iron is well sold. Rolling mills are doing well and rail manufacturers have good orders on hand.

Secure Option on Furnace

Gov. Colquitt, of Texas, has approved the agreement allowing 60 days' option to Philadelphia capitalists desiring to lease the Rusk blast furnace owned by the state of Texas. Attorney Hiram Glass, representing the lessees, was notified they would meet the governor's requirement to pay 5 cents a kilowatt hour for power instead of 4 cents, as the option agreement originally provided.

The Weatherly Steel Co., Weatherly, Pa., has purchased the Lehigh Valley railroad's abandoned shops at that place for $10,000 and will establish a steel plant which is capitalized at $30,000.

LATEST MACHINERY NEWS COLLECTED IN LEADING MANUFACTURING CENTERS

In New York, nothing has developed to indicate that business expansion is less a fact since, than previous to, the election. Houses there continue to book a good volume of orders, and inquiries are coming out freely. Should the present activity hold until the end of November, the month will prove to be as good a business period as any since improvement set in early in the year. Implicit confidence in sustained prosperity over a long period, pervades the trade, and dealers are preparing for it by keeping warehouse stocks up to the maximum when it is possible to do so. Recent sales have been of a miscellaneous character with a few exceptions. The aggregate, however, is satisfactory. Several eastern railroad companies contributed to the total in a small way, buying small lots of shop equipment. The only new list that appeared during the week is that of the Rutland railroad for about 10 machines of small size. It is expected that the Baltimore & Ohio railroad will issue an extensive list of machine tools soon, approximating $100,000 in value. A number of inquiries for cranes have come out recently, including several from South American countries, and dealers report a large amount of work already taken.

In Pittsburgh, a number of machine tool builders advise that the trade is beginning to experience the usual lull that comes at the end and at the beginning of almost every year. Several rather important orders for miscellaneous tools have been placed, and a number of interesting inquiries are pending. The Youngstown Sheet & Tube Co., Youngstown, O., has placed an order for a 108-inch barometric condenser, and the Bethlehem Steel Co., South Bethlehem, Pa., has ordered a large shear and motor. The Duquesne Steel Foundry Co., Kendall Station, Pa., has closed negotiations for a 5-ton Case electric crane, equipped with Westinghouse motors, and the Reeves Mfg. Co., Canal Dover, O., has purchased a 126-inch wide sheet shear. Subsidiary companies of the United States Steel Corporation have been buying machine tools of various description for installation at plants in Pittsburgh. Railroads are beginning to estimate requirements for 1913, and a number of large lists are expected to come out the beginning of the year. Demand for second hand tools has been good.

In Cleveland, the machine tool trade continues to enjoy a heavy volume of business and manufacturers of, and dealers in, various lines of machine tools are finding little fault with current conditions. The largest single inquiry to reach that market last week was one for less than 10 small sized tools, but a few inquiries for larger tools, mostly in single lots, have also been received.

In Cincinnati, business among the machine tool makers is unevenly distributed, some reporting that this month is proving to be a better one than October, while others state that last month was a great deal more productive in the way of orders received. No large lists are being placed by single companies, and most of the business being done at present is on single tools, inquiries for the latter being fairly good. Second hand machinery is still dull. Several large railroads have been feeling the market, and it is quite probable that they will issue some good-sized lists for machine tools soon. The foundry business is improving slowly, and several stove manufacturers report that October was the best month in their history. A recent review of the foundry situation in Cincinnati shows that the plants are being run to about 75 or 80 per cent of their capacity.

Power Plant Equipment

The Eastern Tennessee Hydro-Electric Co. is planning the construction of an electric lighting plant at Jonesboro, Tenn., having recently completed the building of a pole line to that town from Johnson City.

A lighting plant will be erected at Pendleton, S. C., by the Pendleton Electric Light Co., recently incorporated by E. N. Sitton, president and treasurer, and others, with a capital of $5,000.

An electric light plant will be constructed at Adairville, Ky., by the Adair Light & Heating Co., recently incorporated by M. E. Orendorff, B. M. Pulliam, G. A. Smith and J. B. Fisher, with a capital stock of $5,000.

The Metropolitan sewage commission, New York, has prepared plans for extensive improvements to the system for disposing of the sewage of the borough of Richmond. The plans include the installation of five disposal plants at a cost of $841,300. The work of collecting the sewage will be done by automatic electric pumps.

Water Works

The village board of Sheboygan Falls, Wis., has appointed a committee of citizens to investigate the matter of constructing a water works and sewerage system, and report estimated costs, etc.

At a mass meeting at Prairie du Sac, Wis., it was voted that the village board proceed without delay to take steps to install a system of waterworks and fire protection at a cost of not to exceed $35,000. R. G. Walter and J. F. Mead, of the Southern Wisconsin Power Co., were appointed to assist the board in preparing estimates and plans.

The Langstadt-Meyer Construction Co., Appleton, Wis., has been awarded the contract for reconstructing the municipal water works system at Appleton, Wis., at $48,000. The contract for 14 miles of water mains was awarded to Green & Sons of Appleton, at $30,000. The Langstadt-Meyer contract calls for two Diesel oil engines of 225-horsepower each, two oil storage tanks and accessories, foot and check valves, and installation. The contract for the construction and installation of a filtration plant in connection with the reconstructed water works system has been awarded to the Jewel Water Improvement Co., of New York, at $49,-

809. C. H. Vinal is city engineer of Appleton and T. W. Orbison, of Appleton is consulting engineer.

Machine Tools

Bilger & Harley, 209 South Fifth street, Louisville, Ky., are equipping a small machine shop, and will soon purchase a drilling press for their plant.

New Construction

The Alex. Kilpatrick & Sons Foundry Co., St. Louis, is erecting a large one-story foundry of brick and steel, with concrete foundations.

The Standard Woven Fabric Co., Worcester, Mass., is having plans prepared for a brick and concrete factory, 60 x 200 feet, three stories.

The Standard Foundry Co., Dayton, O., is planning to erect a one-story brick foundry on Bish avenue. The structure will cost $3,100.

The Reed-Prentice Co., Worcester, Mass., is to build an addition to its foundry on Gold street. It will be 11 x 8 feet and 15 feet high.

The Pennsylvania General Electric Co. has placed orders covering the structural material for a machine shop to be erected at Erie, Pa.

The Mead - Morrison Co., Singer building, New York, has taken a contract to construct a steel coal and limestone handling plant, for the Minnesota Steel Co., Duluth, Minn.

The Dow Wire Works, Louisville, Ky., is constructing an addition to its foundry and bending department, and will be in the market for bending machinery.

The Eastern Bridge & Structural Co., Worcester, Mass., has been awarded the contract to furnish the steel work for the new buildings of the Pilling Brass Co., Waterbury, Conn.

Anton Perner, architect, 2066 Blackrock avenue, New York, has filed plans for a two-story mill building, 49 x 52, to be erected for James C. Forbes, on Guerlin street, New York.

The Standard Oil Co., 26 Broadway, New York, has acquired two blocks in Greenpoint, L. I., adjoining its plant. It is said the purchaser contemplates improving the property with additional plant facilities.

Plans have been made by the Chicago Bearing Metal Co., Chicago, to erect a plant on a site of 8.44 acres, recently acquired. The proposed plant will be of fireproof construction and will be used for the manufacture of brass goods.

The Belle City Brass & Iron Co., Racine, Wis., has started work on a large addition to its works, made necessary by the constant growth of its business and a fine run of orders which makes the present facilities entirely inadequate.

The Olive Stove Works, Rochester, Pa., is completing extensive additions to its plant in that city. The molding floor, the assembling room and the storage departments have been enlarged. The new additions will be ready for occupancy before Jan. 1.

Grainer & Co., Inc., structural steel, have made arrangements for the purchase of additional machinery for their structural, blacksmith and ornamental iron departments. They are building additions to their plant. About 3,000 square feet will be added.

The Foster Bolt & Nut Mfg. Co., Cleveland, is busily engaged in erecting an addition to its plant, which will about double the present floor space. Machinery will be installed at once to take care of the rapidly increasing volume of business.

New shops of the Blaw Steel Construction Co., Pittsburgh, being erected at Hoboken, Pa., will be ready for occupancy early in January. The company recently purchased an additional plot of 12 acres at Hoboken, which will permit further expansion.

The Standard Underground Cable Co., Perth Amboy, N. J., has let a contract for the constructon of a three - story manufacturing building, 137 x 64 feet. Jenson & Brooks, Smith street, Perth Amboy, prepared the plans.

The L. W. Pond Machine & Foundry Co., Worcester, Mass., is to erect an addition to its plant on Gold and Assonet streets, that city. The new structure will be of brick, steel and concrete construction, 150 x 100 feet, two stories.

The Racine File Co., Racine, Wis., is considering the erection of a new plant in the spring. The company recently became a corporation and has since that time nearly doubled its working force. The growth of its business has been remarkable and the present leased quarters are entirely inadequate.

The S. M. Jones Co., Toledo, O., is building an addition to its machine shops. The new building will be used for a forge shop and will be 30 x 60 feet. Three new steam hammers will be installed in the addition as soon as completed. The building will join the company's machine shops now in operation.

The Ohio Nut & Bolt Co., Elyria, O., is building a one-story brick factory, 77 x 110 feet, at Berea, O. The building is already under process of construction and new machinery, consisting of headers and nut machines, has been purchased. The company expects to increase its output of bolts and to secure additional storage room by the erection of this factory.

Official announcement has been made that the Altoona, Pa., plant of the Pennsylvania railroad will be enlarged. A new engine house, machine shop, blacksmith shop, power plant and a machanically operated coal handling station will be built. The equipment for the increased facilities includes a traveling crane, air compressors, pumps and machine tools.

The Eller Mfg. Co., Canton, O., advises of its intention to erect a one-story building, 280 x 300 feet. The plans are now being prepared and the construction work will start in the spring. The company will use this building for the manufacture of sheet metal goods of every kind, such as it has been manufacturing, steel ceilings, metal roofing, eaves trough and conductor pipe, cornice, skylights and ventilators.

Since the Lavigne Gear Co., Corliss, Wis., formerly of Detroit, moved from its quarters in the Wisconsin Engine Co. works at Corliss to part of the Racine - Sattley factory, at Racine, it develops that the company is making plans for the construction of its own plant in Racine next year. The company is controlled by the Uihlein interests of Milwaukee, who also control the Schlitz Brewing Co.

The J. B. Armstrong Co., Flint, Mich., manufacturer of steel springs, is erecting two buildings. When completed the capacity of the plant will be nearly doubled. One of the buildings will be 85 x 140, and the other will be 35 x 100. The larger one will be used for the heat-treating of high-grade steel for automobiles and the smaller one will be used as a stock room and office. Both buildings will be of brick construction with truss roof, supported by iron posts.

The Niagara Gasoline Motor Co., Buffalo, N. Y., advises that it has acquired a tract of four acres on the Lake Shore railroad, within the city limits of Dunkirk, N. Y., and is constructing on this site a building, 105 x 200 feet. The building will be concrete and steel, steel sash being used exclusively. The company intends to make this the first of a number of buildings to be erected on the site provided, for the manufacture of Niagara motors. The factory will be equipped with new machinery. The concern is being reorganized under the name of the Niagara Motor & Mfg. Co., Inc., with a capitalization of $275,000. Attention will be given entirely to marine motors. The models

include engines for speed and pleasure hulls, fish and freight boats, and tugs.

Grainger & Co., Inc., Louisville, Ky., have been awarded the contract for the construction of the Louisville Railway Co.'s repair shops at Twenty-ninth and Garland avenue, Louisville. The plant will include three buildings, a machine shop, 255 x 230 feet, a carpenter shop 188 x 206 feet, and a paint shop 156 x 192 feet. The shops are intended to handle only the company's work, but will be equipped both to build and repair cars. Nine hundred tons of structural steel will be required. The buildings will be one story, with the "saw-tooth" type of roof, and steel columns, inclosed in brick.

Rapid progress is being made by the M. Rumely Co., Laporte, Ind., in its work of converting an old plant at Battle Creek, Mich., into a works to be operated by the company. A wheel and boiler factory is being added to the plant. The south portion of the building is being torn down and the inside of the main structure is being remodeled for use as a store room. The addition for the boiler factory is being built of brick, 160 x 380 feet. The wheel factory will exceed this in size. On the opposite corner another building is being erected and will be used as a store house for the wheel factory.

New Buyers

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

Hota Engine Co., $100,000; incorporators, I. Fogg, G. D. Hopkins, G. W. Dillman, Wilmington, Del.

Bemiller Fan Blower Co., Butler, O.; $5,000; A. J. Baymiller, R. H. Coakley, L. M. Garber, E. J. Shippe, Wm. H. Kramer.

Eureka Safety Razor Mfg. Co., Kansas City, Mo.; $50,000; incorporators, George F. Rich, Edward Smith and John Merkt.

Sixth City Iron Co., Cleveland, O.; $3,000; B. F. Johnson, William Ward, A. W. Davies, C. A. Chapman and James B. Ruhl.

Vanadium Spring Horseshoe Co., Richmond, Ind.; $8,000; directors, Clayton E. Bedford, Dorah S. Wilt and Frank P. Wilt.

American Telephone Fire Alarm Co., Inc., Rochester, N. Y.; to manufacture and deal in fire alarm telephone and telegraph apparatus, etc.; $5,000,000; incorporators, W. S. Haring, F. H. Smith.

Wire Rope Appliance Co., Tulsa, Okla.; $10,000; incorporators, Paul Arbon, H. M. Preston, M. P. Alexander, of Tulsa, Okla.

Zetterman Machinery Co., Boston; capital stock, $15,000; directors, A. E. Zetterman, president; Emanuel Zetterman, treasurer, and A. Z. Fogel.

Eastern Electric Co., Cleveland: $10,000; Charles O. Nelson, Chas. P. Salen, Mamie A. Salen, Harmon Austin, Helena Smith.

Camden Copper Works, Camden, N. J.; $50,000; copper manufacturing; incorporators, B. Abraham Ahlberg, Wesley J. Barrett and Clark P. Wheaton.

Andrew G. Paul Co., Boston; power systems and plants; capital stock, $300,000; directors, H. W. Sprague, president; Van Courtland Lawrence, treasurer, and D. E. Manning.

Hjorth Lathe & Tool Co., Woburn, Mass.; capital stock, $25,000; directors, H. J. Hjorth, president; Theodore von Rosenvinge Everett, treasurer, and O. E. Landbery.

American Steel Cross Arm Co., Pittsburgh; $300,000; to manufacture iron and steel equipments of all kinds; by H. D. McCutcheon, W. H. Anchor, Pittsburgh; Clifford Mannering, Wilmington, Del.

Ozone Air Water Appliance Corp., Manhattan, N. Y.; manufacturing patented machinery and apparatus; $100,000; incorporators, W. P. Chase, J. P. Morris, M. F. Jackson, New York City.

General Industrial

The Brown & Sharpe Mfg. Co., Providence, R. I., has bought a 3,200-foot lot of land near its plant for development purposes.

J. L. Millspaugh and Fred L. Dowsett are promoting an organization for the establishment of a foundry in Battle Creek, Mich.

The Eleanor Iron Co., Hollidaysburg, Pa., is said to be about to reopen its works in Hollidaysburg, closed since the depression of 1907.

The Chandler Engine Valve Co., Chicago, has been incorporated with a capital stock of $60,000. The incorporators are George A. Chritton, E. F. Hoskin and N. B. Dearborn.

The Duquesne Steel Foundry Co., Kendall Station, Pa., has added a 5-ton Case electric crane, equipped with Westinghouse motors, to its shop equipment.

The Vanadium Spring Horseshoe Co has been incorporated at Richmond, Ind., with a capital stock of $8,000. The incorporators are C E. Bedford, D. S. Wilt and F. P. F. Wilt.

The Perfection Linotyping Co., Chicago, has been incorporated with a capital stock of $10,000. The incorporators are William M. Riordan, James J. Reaney and Chas. P. Hoffman.

A concentrating plant with a daily capacity of 1,000 tons of ore will be constructed near Mascot, Tenn., by the American Zinc Co., which recently acquired 2,079 acres of zinc land at that place.

The Forged Steel Wheel Co., Butler, Pa., allied with the Standard Steel Car Co., has closed negotiations for two merchant bar mills and necessary equipment, to be installed in new shops at that city.

E. X. Jackman, J. E. Theirman and A. H. Jackson, Louisville, Ky., have incorporated the Columbia Machine Co., capital $2,500, and will erect a small plant for the manufacture of novelties.

The Union Mfg. Co., New Britain, Conn., maker of castings and chucks, has bought the business of the Regent Co., Boston, manufacturer of a punch and shearing machine for cutting sheet metal, and will consolidate it with its New Britain plant.

The five remaining tin mills of the American Sheet & Tin Plate Co., at Sharon, Pa., which have been undergoing repairs, started running Nov. 18. The whole 20 mills of the plant are now operating and a long and steady run is expected.

The Sharon Iron & Metal Co., Sharon, Pa., is increasing its capital stock from $50,000 to $100,000. It is reported that the additional stock has already been subscribed. A number of improvements are being made which will greatly facilitate the handling of scrap iron.

The Pittsburgh Crucible Steel Co., Pittsburgh, has placed orders for the entire equipment for a continuous merchant bar mill plant at Midland, Pa., including 14-inch, 12-inch and 10-inch mill trains, gas producers, shears and cooling bed, with the Morgan Construction Co., Worcester, Mass.

The Mesta Machine Co., Pittsburgh, has taken an order for a 108-inch barometric condenser from the Youngstown Sheet & Tube Co., Youngstown, O. The Mesta company also has taken an order for a large shear and motor from the Bethlehem Steel Co., South Bethlehem, Pa.

The Merchant & Evans tin plate plant at North Warwood, near Wheeling, W. Va., began operations last week. The company's plant at Philadelphia has been partially dismantled, in order to equip the West Virginia

mill with necessary rolls and machinery.

Scranton, Pa., has been chosen as the site for a large plant for the manufacturing of bolts and nuts and other articles of that nature. Open-hearth furnaces will be built as the company intends making its own steel. H. Rasbridge, at one time a foreman at the Scranton Bolt & Nut Works, will be manager of the new concern.

The Perfecto Radiator Co., Chicago, manufacturing automobile radiators and specialties, has moved to Racine, Wis., and is occupying a moderate-sized plant at Fifteenth street and the Northwestern tracks. Twenty workmen are employed at present, and this number will be increased as more room is obtained.

The Milwaukee Tank Works has been organized as a corporation at Milwaukee, Wis, by E. E. Bienenstock, E. A. Bienenstock and B. F. Saltzstein. The authorized capital is $25,000. The company proposes to manufacture tanks of all kinds, and make a specialty of gasoline tanks for garages.

The Brier Hill Steel Co., Youngstown, O., has ordered 17 electric cranes from the Morgan Eng. Co., Alliance, O. It has also closed a contract with the General Electric Co., Schenectady, N. Y., for two 1,500-kilowatt turbo-generators. The equipment will be used in the new steel plant which the company is erecting in Brier Hill.

The Atlas Machine Co., Nashville, Tenn., has been awarded the contract for furnishing the hot-water equipment for the addition to the Hermitage hotel, that city. This company is also working on a hoist designed for use by a Burnside, Ky., lumber concern for conveying logs up a mountain. A nine-horsepower engine will furnish the power.

A company is being organized, to have a capital of $150,000, that will engage in the manufacture of coal-washing machinery, in Birmingham, Ala. The site for the location of the industry has been chosen and plans are being made. The new concern will be headed by John G. Cook, president of the Universal Mortgage Bond Co., Birmingham.

Steel Specialties for Canada, Ltd., has been incorporated at Ottawa, to manufacture, buy and sell railway supplies, steel washers, nuts, bolts, patented devices and all sorts of metals. It has a capital stock of $50,000 and will carry on business at Montreal. The incorporators are George Louis Richards, of Boston, Mass., George James Foster, Hugh MacKay, Ralph Frederick Stockwell, and Edson Frenfell Place, all of Montreal.

The Allegheny Steel Co., Pittsburgh, has completed negotiations with the Avenmore Steel Co., Avenmore, Pa., for the lease of the old steel works and foundry at Avenmore, which has been idle for several years. The plant will be fitted up with modern machinery and the making of steel ingot molds will be started at once.

The Bateman-Wilkinson Co., Ltd., has been incorporated at Ottawa with authorized capital of $500,000 to manufacture and deal in agricultural machinery and railway and contractors' supplies. Its head office will be at Toronto and the incorporators are James Houston Spence, James Russell Lovett Starr, Matthew Crooks Cameron, James Aitchison and Lillian Murray Heal, all of Toronto.

The Republic Iron & Steel Co., Youngstown, O., has awarded a contract for the construction of 68 by-product coke ovens, to be built near the Youngstown mill. The plant will have a capacity of about 1,000 tons of by-product coke a day, and after it is in operation the company will not have to depend entirely upon the Connellsville region for its heavy requirements.

The Mesta Machine Co. has received an order from the Alpha Portland Cement Co. for its plant at Cementon, N. Y., for three gas engines direct connected to 600-kilowatt alternating current generators. These engines are to operate on producer gas and are to furnish the power to the new extension at the Alpha plant. This will practically double the capacity of the present plant.

The Canadian Malleable Iron Co., Ltd., with head office at Owen Sound, Ont., has been incorporated at Ottawa. It will have a capital stock of $150,000 and will manufacture, buy and sell malleable iron castings. Messrs. Hugo A. Gutenkunst and Louis E. Best, manufacturers, and Ralph M. Friend, all of Milwaukee, William Wallace, of Philadelphia, and Elias Lemon, of Owen Sound, Ont., are the incorporators.

The Davies Threshing Machine Co., Oshkosh, Wis., has been reorganized and is being refinanced to carry out the policy of expansion and enlargement adopted by the new directorate. The company has, since its organization in 1907, been hampered by lack of capital, but new interests have now entered. The new directors are: John Mulva, mayor of Oshkosh; Charles Neitzel, Abner S. Farrow, John Davies, Arthur Davies, Henry Dedhe, W. A. Kellett and Frank Bowe. The works are located on Ohio street and will be more than doubled in capacity.

A complete stock-handling equipment is being installed at the Keystone blast furnace plant of the Reading Iron Co., Reading, Pa. The stock bins will be constructed of reinforced concrete similar to the bins at the Crumwold furnace of the Reading Iron Co., at Emaus. The work is being built under the designs and supervision of Frank C. Roberts & Co., engineers, of Philadelphia.

The Gem City Machine Co. was incorporated at Columbus, O., recently with a capital stock of $25,000, it being an incorporation of the machinery, jobbing and contractors' supply business operated under the same name by H. E. McAdams and Harry C. Noble at Dayton, O. The company will remove from the old quarters in the Y. M. C. A. building to East First street. The incorporators were: H. E. McAdams, Harry C. Noble, W. C. Smith, John Van Deman and Edward E. Burkhardt.

The contract for the gas producers for the two additional open-hearth furnaces being constructed by the Republic Iron & Steel Co., Youngstown, O., has been awarded the Wellman-Seaver-Morgan Co., Cleveland. Five Hughes type producers will be installed. The new furnaces will give the company a total of 10. Foundation work on the four additional hot blast stoves for No. 1 stack at Haselton has started. The William B. Pollock Co., Youngstown, has the contract for the steel plate work for these stoves.

The Ohio Ceramic Engineering Co., Cleveland, advises that it has taken an order for 1,000 brick dryer cars for the Sayre & Fisher Co., Sayreville, N. J., to be shipped some time in February of next year. The Ceramic company, organized about seven years ago, has been enjoying the best season in its history and has enough orders on its books to keep the plant busily engaged for about four or five months. In September all previous records were broken and October was almost on a par with the preceding month.

The Universal Swing-Joint Co., Louisville, Ky., is preparing patterns for the patent flexible steam joint, which it will manufacture, and will submit these, when completed, to machinery manufacturers in order to get prices on machinery for their plant. The company took over the plant of the Kentucky Gear & Machine Co., 901-905 W. Jefferson street, some time ago. A. J. Binder, the former superintendent of the plant,

has been succeeded by John Bridges. Mr. Binder is now with the Globe Machine Co., Louisville.

According to reports heard in the Pittsburgh district, a company is being organized at East St. Louis, Ill., to take over the Tudor works of the Republic Iron & Steel Co., Youngstown, at that place. The plant was abandoned last July, when it was announced it would be dismantled. Thomas Cunningham, superintendent of the works when it was in operation, and several East St. Louis capitalists are back of the movement to buy the plant. An attempt has been made to lease the plant, but the Republic company has declined to consider such offers.

The Aluminum Co. of America, with headquarters at Pittsburgh, has under consideration a proposition from the Tennessee Power Co. and the Tennessee River Power Co., at Chattanooga, Tenn., to furnish 40,000 horsepower for the operation of the Aluminum company's proposed plant, the location of which has not yet been decided upon. The company has arranged for 16,000 horsepower supply for five years from the Eastern Tennessee Power Co., to be supplied within 30 miles of Cleveland, Tenn., and indications are that the plant will be located at Loudon, Tenn.

Recently organized on a basis of $200,000 minimum capital, common stock, the National Cast Iron Pipe Co. has purchased a site near Boyles, Ala., about five miles from the center of Birmingham, where ample railroad and street car facilities are available, with an abundance of running water. It is proposed to build a strictly modern pipe foundry, with equipment for making gas and water pipe, 4 to 30-inch. Building operations will begin immediately, the company advises. The organization includes the following: President, A. H. Ford; vice president and general manager, E. E. Linthicum; secretary and treasurer, A. E. Nelson. The officers and the following comprise the directorate: Felix I. Tarrant, Dr. D. W. McMillan, George B. Tarrant, Col. F. M. Jackson All of the officers and directors reside in Birmingham, with the exception of Dr. McMillan, whose home is in Pensacola, Fla.

Financial

Elmer Wetzel has been appointed receiver for the Hoosier City Boiler Mfg. Co., Indianapolis.

The Vermillion Malleable Co., Chicago, has increased its capital stock from $500 to $125,000.

The Streit Machine Co., Cincinnati, has sold its factory plant at Marquis street and the Canal boulevard, to the Park Laundry Co., that city, the price being $16,000.

The Chicago Bearing Metal Co., Chicago, has increased its capital stock from $500,000 to $1,000,000.

The Montague Iron Works Co., Montague, Mich., with liabilities at $15,000 and assets at $27,000, has gone into voluntary bankruptcy.

The plant of the Standard Steel Car Co., at Hammond, Ind., was damaged Nov. 13 to an estimated amount of $100,000, as the result of a fire in the central power plant. The works are closed down and 2,600 men are temporarily out of employment.

A petition in bankruptcy has been filed for the Richmond Sales Co., which represented the McCrum-Howell Co., manufacturer of heaters and vacuum cleaners and now in the hands of receivers. The liabilities of the sales company are scheduled as $677,287, of which $441,558 are due the McCrum-Howell Co. The assets amount to $72,370.

The reorganization committee of the United States Motor Co., announces that over 90 per cent of the indebtedness of the Alden-Sampson Mfg. Co., Brush Runabout Co., Columbia Motor Car Co., Dayton Motor Car Co. and the Maxwell-Briscoe Motor Co., have been deposited subject to the reorganization plan of Oct. 10. In order to enable the creditors whose claims have not yet been deposited to participate in the benefit of the plan, the committee has determined to accept deposits until Dec. 9.

Trade Notes

Upon completion of repairs, expected to require 90 days, the Wheatland, Pa., rolling mill of the Shenango Iron & Steel Co. will resume.

The Starrett Tool Co., Athol, Mass., which employs about 700 skilled mechanics, and which has been running on a 50-hour-a-week basis for several years, has changed to a 54-hour schedule. The Union Twist Drill Co., also of Athol, has started on an overtime schedule of three nights a week in several departments.

Recent sales reported by the Alliance Machine Co., 42 Broadway, New York, include: One 15-ton powerhouse crane; one 10-ton stock-yard crane, with 84-foot span, and one 75-ton four girder ladle crane to the Bethlehem Steel Co., South Bethlehem, Pa.; one 50-ton hydraulic riveter to the Baldwin Locomotive Works; one 10-ton trolley crane, with auxiliary hoist, to the Midvale Steel Co., Philadelphia.

The Pittsburgh Steel Co. has leased the F. J. Horn building, Kansas City, which is to be the jobbing point of the company for the middle west and southwest territory. Manufactured products valued at $200,000 will be placed in the Kansas City branch at once, it is said, and 15 traveling men will work out of that city. The products will be shipped to Kansas City by water. Assurance that Missouri river navigation is on a firm footing is said to have been a factor in the company locating its branch in Kansas City.

Fires

Fire did damage estimated at $10,000 to the foundry of the Fisher Machine Works Co., Leavenworth, Kan., recently.

Slight damage was done by fire at the plant of the Wisconsin Foundry & Machine Co., Madison, Wis., recently.

The old plant of the Vulcan Detinning Co., Sewaren, N. J., was practically destroyed, by fire recently, but the new addition to the plant was not damaged, according to advices from Sewaren.

The Crown Pipe & Foundry Co., Jackson, O., manufacturer of cast iron soil pipe and fittings, was damaged to the extent of $150,000 by fire last week. The entire plant, with the exception of the machine shop and office building, was destroyed.

A loss of $15,000 was occasioned by a fire, which on Nov. 13, nearly destroyed the plant of the Paris Mfg. Co., Paris, Ky. C. V. Higgins, Paris, manager of the company, reports that the machinery in the plant was badly damaged and most of it will have to be replaced.

The plant of the George E. Wood Tool Co., Southington, Conn., which is owned by the Stanley Rule & Level Co., New Britain, Conn., was damaged to an estimated amount of $15,000 by fire last week. The burned buildings were a frame structure and a large part of the loss was on machinery. They will be rebuilt, according to a statement made by President A. W. Stanley.

The fire at the plant of the Abram Cox Stove Co., Philadelphia, Nov. 12, caused damage estimated at $200,000 or more. A considerable part of the extensive works was ruined and a heavy loss in patterns was sustained. The fire is said to have originated from sparks from a locomotive which fell upon a quantity of excelsior in the yard and quickly communicated the blaze to the pattern shop. This is the second fire to occur at the Cox plant in several months. On Aug. 8, a considerable section of the works suffered damage from this source.